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Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Respecting the Official Work of the American Gas Light Association.

AMERICAN GAS LIGHT ASSOCIATION,
SECRETARY'S OFFICE,
530 Broadway, N. Y., Dec. 13, 1904.

To the Members American Gas Light Association: As there seems to be some misunderstanding respecting the standing of the official management of the Association, members will please note that the undersigned is the Secretary of the Association, and that Mr. A. E. Forstall is carrying forward the work of the Practical Class. All correspondence in connection with the Practical Class should therefore be addressed to Mr. A. E. Forstall, 58 William street, and all other matter pertaining to the Association to MR. GEORGE G. RAMSDELL, Secretary, at the above address.

[NOTICE.]

Next Place of Meeting, Ohio Gas Light Association.

OHIO GAS LIGHT ASSOCIATION,
OFFICE OF THE SECRETARY,
DELAWARE, O., May 26, 1905.

To the Editors AMERICAN GAS LIGHT JOURNAL: At the twenty-first annual meeting of the Ohio Gas Light Association, which was held in Pittsburgh, Pa., March 16th, 17th and 18th, the selection of a place for holding the twenty-second annual meeting was left in the hands of the Executive Committee. This Committee now report that they have selected Cincinnati as the place for holding the meeting, March 21st, 22d and 23d, 1906. Yours very truly, T. C. JONES, Secretary.

[NOTICE.]

The July Meeting of the Pacific Coast Gas Association.

PACIFIC COAST GAS ASSOCIATION,
OFFICE OF THE PRESIDENT,
SAN FRANCISCO, CAL., May 24, 1905.

To the Members of the Pacific Coast Gas Association:

Date of Meeting.—Attention is again called to the coming meeting of the Pacific Coast Gas Association, which will be held in this city, July 18th, 19th and 20th next, a little less than two months distant.

Question Box.—Mr. E. C. Jones has kindly consented to edit the Question Box for this year's meeting, and inquiries in connection therewith should be sent to him, his address being 628 Rialto Building, San Francisco. The Question Box is a department of the Association work which is of continually increasing importance, and Mr. Jones' editorship will insure success, especially so if the members will make free and unhesitating use of his valuable services.

New Members.—What have you done towards increasing the life and value of the Association by adding new members? Blanks have been furnished you for this purpose, and if you have not already sent a name or two to the Secretary it is earnestly hoped that you will soon do so, as you must certainly know of some eligible and desirable person whom we would like to welcome as an active member, or firm as an associate member.

LIBRARY OF CONGRESS
JUN 5 1905
SMITHSONIAN DEPOSIT.

Department Editors.—Do not overlook the fact that Mr. G. S. Colquhoun, of Fresno, is the "Wrinkle" Editor; Mr. R. P. Valentine, of Sacremento, is the "Experience" Editor; Mr. G. H. Hollidge, of Oakland, is the "Novelty" Editor; and Mr. Geo. P. Low, of San Francisco, is the Association Historian, All of these departments need your assistance.

Programme.—An excellent programme is being arranged and all members should now begin arrangements to be present.

Very sincerely and fraternally, L. P. Lowe, President.

BRIEFLY TOLD.

The Iowa Gas Association.—Last week we noted that an outcome of the Western's meeting was the determination of many men prominent in the gas business of Iowa to organize a State Gas Association. Since that mention was made rapid work has been accomplished by the *pro tem.* officers named, and as an earnest that the work is not to be neglected we publish the following circular, issued under date of the 29th ult., by Mr. F. W. Kelley, the Secretary-Treasurer *pro tem.:*

Iowa Gas Association,
Office of Secretary,
Davenport, Ia., May 29, 1905.

Dear Sir: During the meeting of the Western Gas Association, in Chicago, the Iowa representatives decided to organize a State Association, the following cities being represented: Boone, Burlington, Davenport, Waterloo, Dubuque, Sioux City, Des Moines, Cedar Falls, Iowa City and Muscatine. Temporary officers were selected.

The object of this Association primarily is to bring together once each year representatives of as many companies as possible for the interchange of thought and methods relating to the gas industry. Inasmuch as we are all working practically under the same conditions, this Association should prove to be of inestimable value to its members.

In the opinion of those who made the temporary organization, the dues should not exceed $3 per year. It has been suggested that the first regular meeting be held at Des Moines, Ia., during the State Fair in September.

We hope to start the meeting with the membership of every gas company in the State, and respectfully ask you to use your influence to this end. Also, please give the writer, as early as convenient, an expression of your views on membership, dues, time and place of meeting, and any other subjects of interest.

Notes——

The Cincinnati Gas and Electric Company has added to its real estate holdings a plot 475 feet on the east side of Spence street, 100 yards or so south of Eastern avenue.

The latest move in parental control or the partial direction of the Denver (Col.) Gas and Electric Company by the Denver authorities is in line with the placing of a municipal conduit for underground wires, to be owned and operated by the city, and to be rented to the Denver Gas and Electric Company. It is also on the cards that the local telephone and telegraph companies are to be co-tenants.

The plant of the Canadian Gas Meter Company is to be removed from Windsor to Hamilton, Ont.

A correspondent in Rutland, Vt., writing under date of the 29th ult., incloses the following: "Otto Bannard, President of a New York Trust Company, and Douglas Robinson, of New York, who are in charge of the Merchants' Trust Company, of New York, which closed its doors some days ago, were here last week to examine the affairs of the Rutland Street Railway Company, the Peoples Gas Light Company, and their holding corporation, the Chittenden Power Company. The Merchants' Trust Company loaned $300,000 to these concerns for the development of their properties. Mr. Robinson and the New York Trust Company are the receivers of the Merchants' Trust Company. President Bannard and Mr. Robinson held a conference with General Manager David Fox. The New York men afterward inspected the various properties. The only development here since the New York failure has been the suspension of construction work by the Chittenden Power Company. General Manager Fox says he expects operations will be resumed in the near future."

Mr. Norman G. Kenan, President of the Cincinnati Gas and Electric Company, was united in marriage, to Miss Ruth M. Waldenberg, the evening of May 23rd. The ceremony was performed in the bride's home, Windham avenue, Avondale, Cincinnati, the Rev. Doctor H. M. Curtis officiating. May they always happy be.

[Official Report.—Revised by the Secretary.]

TWENTY-EIGHTH ANNUAL MEETING, WESTERN GAS ASSOCIATION.

Held at Chicago, Ills., in the Auditorium Hotel, May 17, 18 and 19.

First Day—Morning Session.

The President, Mr. O. O. Thwing (St. Louis, Mo.,) called the meeting to order, at 10:15 A.M., Wednesday May 17th. The Secretary's desk was in charge of Mr. James W. Dunbar, of New Albany, Ind. The President introduced Mr. H. S. Taylor, City Prosecuting Attorney for Chicago, who, speaking in behalf of Mayor Dunne, made the following

Welcoming Address:

Mr. Chairman, Gentlemen of the Western Association of Gas Engineers: Until this morning it was the confident expectation of his Honor, Mayor Dunne, that he would be present himself at this hour and perform in person the pleasant function that has fallen to me. When I arrived at the City Hall, however, this morning, I was summoned to the Mayor's office and he asked me to be his representative on this occasion. He charged me to extend to you his respectful salutations and to express to you a welcome upon his behalf and upon behalf of the city of Chicago upon the occasion of this gathering. He charged me to say that nothing but a pressing and imperative duty would have been permitted to interfere with what would have been to him a pleasant office as well as a duty. He also asked me to assure you, gentlemen, that you may meet and conduct your meetings in Chicago without any particular trepidation, notwithstanding the prevalence here of a great industrial disturbance, the exigencies of which are now commanding his attention. You are to be assured that you are in no danger in Chicago, except perhaps the chance of a fit of indigestion, if you shall have a banquet, as I presume you will have; that you will not be held up—outside of a hotel (laughter)—and that the chances of any disturbance here upon account of your convention are at least very small—unless it shall so happen that your Chairman, Mr. Copley, Mr. Williamson and those other gentlemen who represent the business locally fail to be duly entertaining and hospitable toward the visiting members of this Association. If they should neglect this hospitable duty, then in the apprehension of Mayor Dunne that will constitute disorderly conduct of the most pronounced character and my department will attend to it.

Now, gentlemen, it is a mere perfunctory office for me to say, "Welcome to Chicago!" It is superfluous. It is piling Pelion on Ossa. Chicago is a great central city, that has been made what it is by the contributed intelligence and industry of all America and Canada and neighboring countries. The gas engineers, gentlemen of your profession and calling, have contributed their part. And so, when visiting members of your Association come here they are coming home, they are coming to their own, they are entitled to a hearty welcome from all of the people of Chicago and from its chief magistrate and his official aides. So I say to you, gentlemen, this morning, that you are sincerely and heartily welcome. The Mayor wishes for you a pleasant, prosperous and instructive session of your Association.

And right here, with conviction that what you will have to say to each other in the discussion of your business will be far more instructive and entertaining than anything I can offer in these unstudied words, I will abruptly conclude by saying that the Mayor represents the city of Chicago in according to this good looking and intelligent looking Association its proper measure of consideration and respect. Gentlemen, you are most heartily welcome to the city of Chicago. (Applause.)

The President introduced Mr. I. C. Copley, of Aurora, Ills., who delivered the following

Response to Mr. Taylor's Welcoming Words:

Mr. President, Mr. Taylor, and Gentlemen of the Western Gas Association: We are deeply sensible of the claims upon the honored Mayor's time, and we thank his representative very much for the cordial welcome extended to us in his behalf. We know more or less of the city of Chicago. We also know more or less of the Mayor, and through him his official regime. In the strenuous campaign which has so happily ended by placing him in his present exalted position, if there had been any shortcomings in his character we should certainly have heard of them. We want you to know us. We are representing practically the entire country. We are engaged in serving the public in our monotonous way, possibly obscure way, just as your honore

chief is in his distinguished way. We hope to meet you and him in the same spirit of simplicity, candor and straightforwardness. We are here to improve ourselves, and by improving ourselves we hope to improve the quality of our service to the public.

We know very well the chances that we took in coming to Chicago. We know the chance of the hold-up man. Most of us have been in Chicago more than once and have met him in all his different disguises. We know the chance we take from your scorching automobile drivers. We know the chance we take that one of your sky-scrapers might collapse at an inopportune moment. We know the chance that we take in a mix-up with your strikers, and possibly a mix-up with your strike-breakers, and we also know the chance that we take from an explosion on the Lake front. I regret to say it is possible the New York contingent is not as numerous as it might have been, had they not feared that the articles which their newspapers have been publishing about the state of affairs in Chicago were true. On the other hand our P esident will assure you, or could assure you, if he would frankly unbosom himself, we probably have a larger delegation here from St. Louis, because they fear that it is not true. I wish, Mr. Taylor, you would take a message from this Association to your honored chief, Mayor Dunne. I first want to introduce to you one of the sages of this Association, "Uncle" Jerry Howard. "Uncle" Jerry, please stand up.

He is the gentleman with the white beard, who has spent a lifetime in the gas business. He is an honorary member of this Association. He, too, comes from Glasgow, although he is as Scotch as Scotch whiskey itself. Now, in the event that your Chief should see an opportunity to widen his plans of municipal ownership, we all from experience of the last 82 or 83 years have reason to believe that Uncle Jerry will still be with us. We will save him the expense account of the trip of an expert from Glasgow, and if he will pardon any of the youthful indiscretions or errors of "Uncle" Jerry during this time this Western Gas Association will loan "Uncle" Jerry to his Honor. (Laughter and applause.) Necessarily we are watching your experiment here as worked by Mayor Dunne, with a great deal of interest, and whatever may be the outcome, whether he prosecutes that to a successful conclusion or not, those of us who know Mayor Dunne are more than satisfied that he brings to the task, stupendous as we believe it to be, unusual qualities of mind and character. We thank you very much.

Appointing Some Special Committees.

The President announced the appointment of the following special committees:

Place of Next Meeting.—Messrs. A. H. Barret, George Clark and Wm. McDonald.

Introduction of Visitors.—Mr. J. B. Howard.

Final Resolutions.—Messrs. K. M. Mitchell, George McLean and Irvin Butterworth.

Vice-President Doty assumed the Chair, and the President read his

INAUGURAL ADDRESS.

[For the text of President Thwing's address see JOURNAL, May 29th, 1905, page 843.]

Committee on President's Address.

On motion, the address was ordered referred to a committee of three for consideration and report, and Vice-President Doty appointed as such committee Messrs. E. G. Pratt, Alfred E. Forstall and W. E. Steinwedell.

The President resumed the Chair and said, no objection offering, the reading of the minutes and the roll call would be deferred. He then called for the

Report of the Board of Directors,

which was read by the Secretary as follows:

Chicago, Ills., May 16th, 1905.

The annual meeting of the Board of Directors of the Western Gas Association was held in the Auditorium Hotel at 10 A.M., with the President, Mr. O. O. Thwing, of St. Louis, in the Chair. The following members were in attendance: Paul Doty, First Vice-President, St. Paul, Minn.; K. M. Mitchell, Second Vice-President, St. Joseph, Mo.; Wm. McDonald, Albany, N. Y.; J. D. McIlhenny, Philadelphia, Pa.; W. A. Baehr, St. Louis, Mo.; Thomas D. Miller, New Orleans, La.; James W. Dunbar, New Albany, Ind.

On motion, the following papers were recommended for presentation to the Association:

"Cement Joints," by Jacob D. Von Maur, St. Louis, Mo.

"Use of Tar as Fuel in Bench Firing," by Mr. F. C. Sherman, New Haven, Conn.

"The Prevention of Stoppages in Services, Meters and House Pipes in Cold Weather," by Mr. Irvin Butterworth, Grand Rapids, Mich.

"Wrinkle Department," edited by Mr. W. A. Baehr, St. Louis, Mo.

"Kansas Oil," by Mr. K. M. Mitchell, St. Joseph, Mo.

"Calcium Carbide and Acetylene," by Mr. J. M. Morehead, Chicago.

"Coal Sampling and Testing," by Mr. W. B. Calkins, Fairmont, Va.

"The Practical Enrichment of Low Candle Power Coal Gas with Benzol: Its Convenience and Advantages," by Mr. F. B. Wheeler, Detroit, Mich.

"Texas Oil Fields," by Mr. Thos. D. Miller, New Orleans, La.

"The Rotary Blower and Exhauster: Its Construction, Efficiency and Application," by Mr. George C. Hicks, Jr., Connersville, Ind.

"The Evolution of the Gas Engineer," by Mr. B. E. Chollar, Kansas City, Mo.

The paper by Mr. U. D. Cochran, not having been received, was referred to the Executive Committee.

On motion of Mr. Dunbar it was voted that the Board of Directors recommend the appropriation of $500 to the Gas Educational Fund of the American Gas Light Association, the same to be paid in $100 annual instalments.

The Secretary-Treasurer submitted his annual report, which as Treasurer showed a receipt for the year of $2,596.40, an expenditure of $2,874.04, and a balance of $718.46. As Secretary the report showed a total membership of 472—both reports being rendered to May 1, 1905.

The President appointed the following committees:

Auditing.—Messrs. Wm. A. Baehr, K. M. Mitchell, Thos. D. Miller.

New Members.—Wm. McDonald, K. M. Mitchell, John D. McIlhenny.

Memorials.—John McIlhenny, Wm. McDonald, John Gribbell, F. H. Shelton.

10 A.M. and 2 P.M. were selected as the hours for convening the sessions. No further business offering, the Board adjourned.

On motion of Mr. E. G. Pratt (seconded) the report was received and ordered spread upon the minutes.

The Secretary—Does that include that recommendation contained therein, in reference to the appropriation of $500 to the educational fund?

Mr. Pratt—Yes, sir.

The President said that a local photographer wished to make a flash-light photograph of the assembly at the close of the session in the afternoon, and that anyone who wished to be photographed should be present at that time. He then called for the

Report of Committee on Applications for Membership.

Mr. Wm. McDonald—The following gentlemen have been proposed for membership in the Association:

Active.

Averill, A. T., Cedar Rapids, Ia.
Atwater, C. G., New York City.
Allen, Wm. H., Newark, N. J.
Abell, W. A., Taylorville, Ills.
Berry, F. K., St. Paul, Minn.
Baer, H. S., Hancock, Mich.
Burgess, C. F., Madison, Wis.
Barger, E. T., Detroit, Mich.
Beach, E. C., Chicago Heights, Ills.
Cronin, E. A., Kansas City, Mo.
Collins, H. P., Little Falls, N. Y.
Connors, M., Chicago, Ills.
Chichester, A. A., Chicago, Ills.
Crawford, H. T., Waukegan, Ills.
Chamberlain, G. R., Grand Rapids, Mich.
Crowell, F. B., Atlanta, Ga.
Crighton, D. K., Oak Park, Ills.
Duncan, F. C., Galesburg, Ills.
Davis, D., Litchfield, Ills.
Dawson, G. H., La Grange, Ills.
Dibbens, W. J., Chicago, Ills.
Dougherty, B. R., Richmond, Ky.
Earnshaw, E. H., Cincinnati, O.
Ferris, W. J., Monmouth, Ills.
Farr, A. L., Chicago, Ills.
Fogg, O. H., Flushing, N. Y.
Gille, H. J., St. Paul, Minn.
Greim, O. F., Milwaukee, Wis.
Graf, C. H., Indianapolis, Ind.
Gross, A. H., Sterling, Ills.
Gutsche, E. J., St. Paul, Minn.
Humphrey, H. H., Jefferson City, Mo.
Higgins, H. C., Dixon, Ills.
Harrington, A. S., Chicago, Ills.
Hammon, W. H., Pittsburgh, Pa.
Hutchinson, W. E., Hudson, Kas.
Johnson, H. B., New Decatur, Ala.
James, F. M., Aurora, Ills.
Jenks, R. J., Evanston, Ills.
Jelliffe, C. N., New York City.
Johnston, J. P., Princeton, Ind.
Levings, W. H., Minneapolis, Minn.
Lane, R. M., Chicago, Ills.
Lane, F. K., Fishkill Landing, N.Y.
McLaughlin, R. A., Galesburg, Ills.
McDonald, W. B., Evansville, Ind.
Milligan, A. L., Detroit, Mich.
Miller, R. L., Muncie, Ind.
Markley, J. C., Chicago, Ills.
Moore, H. M., Austin, Tex.
Morehead, J. M., Chicago, Ills.
Newberry, F. E., Kankakee, Ills.
Osborn, M. C., Butte, Mont.
Parker, J. R. Hancock, Mich.
Pease, A. C., Lowell, Mass.
Price, F. L., Highland Park, Ills.
Patten, J. A., Manitowoc, Wis.
Reese, R., Memphis, Tenn.
Richards, F. M., Madison, Wis.
Rice, H. L., Aurora, Ills.
Shepard, F. C., Minneapolis, Minn.
Rand, A. T., Minneapolis, Minn.
Shattuck, A. F., Detroit, Mich.
Scott, E., La Porte, Ind.
Stratton, C. J., Chicago, Ills.
Shumway, J. N., Taylorville, Ills.
Sinsel, O. A., Detroit, Mich.
Schwarm, C. A., Detroit, Mich.
Schmidt, E. G., Springfield, Ills.
Shockley, B. J., Albert Lea, Minn.
Steinwedell, C. S., St. Paul, Minn.
Stiles, H. B., St. Paul, Minn.

Strohn, C. B., Aurora, Ills.
Turneaure, F. E., Madison, Wis.
Traver, A. F., Grand Rapids, Mich.
Utley, B. L., Watertown, Wis.
Wilkinson, A. L., Detroit, Mich.
Wolff, S. E., Jackson, Mich.
Wortendyke, I. F., Janesville, Wis.
Wright, E. J. H., Oak Park, Ills.
Young, J. M. H., Joplin, Mo.

Associate.

Asendorph, C., Chicago, Ills.
Buel, T. D., Detroit, Mich.
Brown, C. H., Des Moines, Ia.
Borat, E., Baltimore, Md.
Black, B. A., New York City.
Carney, M. J., Chicago, Ills.
Cruse, A. R., Philadelphia, Pa.
Carter, T. B., St. Louis, Mo.
Collins, H. S., St. Louis, Mo.
Callahan, A. F., Chicago, Ills.
Cressler, G. H., Fort Wayne, Ind.
Douglas, R. C., Chicago, Ills.
Dickey, E. S., Baltimore, Md.
Darling, W. S., North Chicago, Ills.
Fuertado, R. S., Chicago, Ills.
Tracy, J. F., St. Louis, Mo.
Flinn, C. F., Chicago, Ills.
Flower, W. L., St. Louis, Mo.
Gregory, G. H., New York City.
Green, J. L., St. Louis, Mo.
Healan, R. H, Chicago, Ills.
Hobdell, G., Jr., Philadelphia, Pa.
Horton, A. W., Chicago, Ills.
Hulswitt, F. T., Grand Rapids, Mich.
Jenks, L. B., Chicago, Ills.
Lockwood, W. A., St. Louis, Mo.
Leiter, J., Chicago, Ills.
Lovett, E. C., Oak Park, Ills.
Melcher, C. W., Chicago, Ills.
Moon, O. P., Cleveland, O.
Ordway, L. P., St. Paul, Minn.
Polk, R. W., St. Louis, Mo.
Porter, R. G., Pittsburgh, Pa.
Pratt, H., Chicago, Ills.
Printz, C. H., Fort Wayne, Ind.
Seeger, R., St. Louis, Mo.
Strain, J. R., Chicago, Ills.
Scott, T. J., St. Louis, Mo.
Sherburne, J. M., Chicago, Ills.
Ummach, C. E., Chicago, Ills.
Wortham, E. L., Des Moines, Ia.
Whitaker. M. C., New York City.
Woodward, W. B., St. Louis, Mo.
Zitzewitz, H., Chicago, Ills.

Election of New Memrers.

The President—Gentlemen, you have the report of the committee on applications for membership. What is your pleasure?

On motion of Mr. Steinwedell the Secretary was instructed to cast the ballot of the Association in favor of electing to membership the gentlemen recommended by the Committee. The Secretary subsequently reported that the instruction had been carried out, and those of the newly elected members present were welcomed to the privileges conferred by Mr. J. B. Howard.

Mr. McDonald—I learn that there are one or two gentlemen who think their names should have been amongst those just acted upon, and probably ought to have been, but who are not on the list. I want to say to them that there will be another report of the membership committee tomorrow morning, introducing some more members. We will then correct the tabulation.

An Announcement by the Secretary.

The Secretary—As part of the entertainment provided by the local committee, there will be on Friday afternoon a trip through the tunnels that are being constructed in Chicago. These tunnels are considered an engineering feat, and I do not believe that any of the members of the Western Gas Association will want to go away from this city without beholding their wonders. All work on the tunnel will be stopped during the hours that we make the trip, so that the members of the Association will have full opportunity to view the work that has been and is being done. This trip has been arranged for Friday, at 1:30 or 2 P.M.

(To be Continued.)

Recent Developments of Purifying Plant: Some Further Notes on Jager Grids.

[A paper read by Mr. J. C. Belton, of Chester, at the last meeting of the Manchester District Institution of Gas Engineers.]

It is first of all necessary to give you the reason for my appearing before you to-day with what must be to some extent a repetition of matter that has already appeared in an article which I contributed to the *Journal of Gas Lighting* in February last. That article has been the subject of so many inquiries from gas engineers who wished for further particulars, that when our Secretary invited me to bring a paper to this meeting—having no other subject of immediate interest in hand—I rashly mentioned "Jägers" as a possibly acceptable theme, and was immediately "booked."

The article alluded to was confined chiefly to a statement of the working results obtained during the first 6 months' use of Jäger grids at the Chester gas works, and nothing was said as to the method of adapting existing purifiers to the new system, or in description of the system itself. Messrs. S. Cutler and Sons have very kindly come to my assistance on the present occasion by lending their large model of a Jäger purifier; and it can be inspected at the close of the meeting. The drawings hung up before you show how the ordinary purifiers may be altered to suit the new conditions of working.

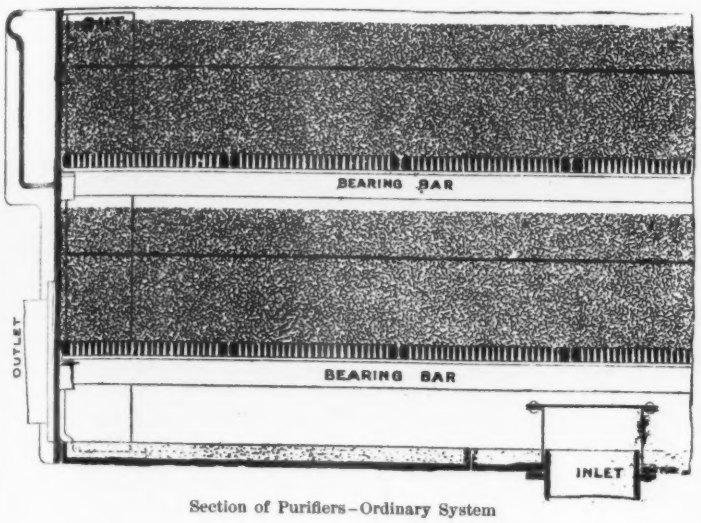
The essential features of the Jäger system of filling purifiers are the special grids and the horizontal travel of the gas. You may have a purifier filled with similar grids; but if the old vertical travel of the gas is retained, it is impossible to obtain the results achieved by the Jäger system. I suppose all, or nearly all, the purifiers in use in this country were constructed on the usual plan of introducing the gas through the bottom of the purifying vessel and causing it to pass upwards through one, two, or more layers or trays of purifying material, into the cover, where it is collected to one or perhaps two outlet pipes, whose open end is just above the level of the material in the box. The superficial area of a purifier so arranged represents the area of contact, or contact surface exposed to the gas; and taking this as the divisor and the make of gas per second as the dividend, we get at the speed of the gas through the purifying material. Newbigging's rule for determining the proper area of purifiers results in a speed of 0.019 foot per second, and may be accepted as a standard for ordinary work, though greater economy in working might be obtained by using the constant 0.8, instead of 0.6, in determining the area.

Now, it does not matter what depth of material you have in a purifier of the ordinary type, the speed of the gas will always be the same—that is, it will always bear the same ratio to the superficial area of the purifier. But in two purifiers of the same area, one containing two grids of material each of 1 foot in depth, and the other containing two grids each 2 feet in depth, while the speed of the gas is the same in both, the latter, having double the mass of material, would run twice as long as the former; but the resistance or back pressure would be more than double the resistance in the shallower material. This was the difficulty I had always met with in attempting to obtain a higher duty from my purifiers by increasing the quantity of material through which the gas must pass. It was all very well in summer to increase the depth of oxide on the grids. The make being then at the minimum, it was possible to fill a purifier to its greatest capacity without the resistance being sufficient to overcome the water seal. But as soon as the approach of winter made it necessary to put more retorts in action, the depth of the material in the purifiers must be decreased, or blowing would soon announce the presence of excessive pressure.

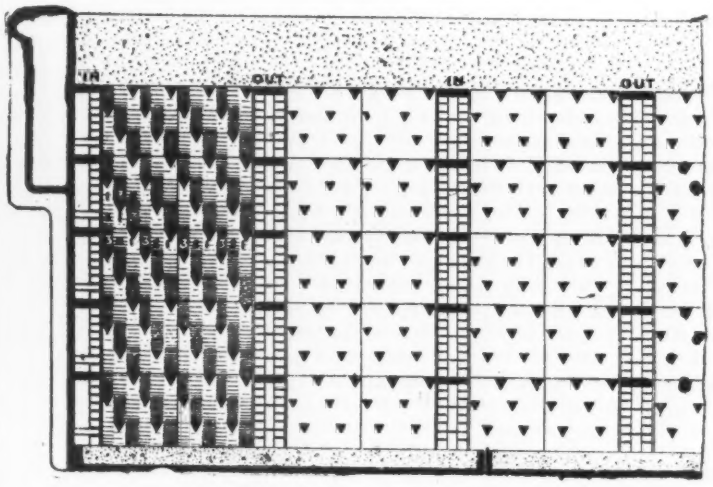
I could not find any means of increasing the contact area without enlarging the purifiers, or of avoiding the increased resistance obtained by increasing the depth of the material. What I wanted was a method by which the contact surface and purifying mass could be simultaneously increased, so as to obtain a slower speed of travel through the material and a corresponding decrease of resistance and extension of purifying efficiency. It was given to our German friends to discover the solution of this problem, and to demonstrate that it is only possible of attainment by altering the direction of the gas travel from the vertical to the horizontal. This is the basis of the Jäger system; and the thing is so simple, now it is demonstrated, that one naturally asks, "Why didn't we think of it before?" By dividing the mass of purifying material into vertical sections, by the insertion of alternate inlet and outlet conduits, it is possible to put from 20 to 80 per cent. more material in a purifier of any given superficial area; the vertical subdivision of the mass of material and the volume of gas give a very large increase of contact surface with a corresponding simultaneous decrease in speed of travel and back pressure. By these means, the run or life of a purifier is greatly extended; and the labor of emptying and refilling a Jäger purifier being no more than that required by the older system, there is an economy corresponding to the reduction in the number of changes taking place in any given period, less the increase in the quantity of material handled.

I have here a drawing of a section of our ordinary purifiers, showing the position of the inlet and outlet connections and the method of filling the box. The broad line through the mass of material shows the difference in depth of the layers for the summer and winter work. The area of the box is 24 feet by 22 feet, or 524 superficial feet, deducting the standards. This is the area of the contact surface, and it is obvious that no alteration in the depth of material on the grids will affect the speed at which a given make of gas must pass through the box. The mass of oxide contained works out to 1,572 cubic feet effective in summer and 1,048 cubic feet in winter; so that while the speed of travel increased with the make, the time contact and mass contact decreased, and the run of the purifier was shortened much more than would have been the case if the increased volume of gas had the same mass of material to pass through as in summer.

The next drawing shows the same purifier fitted with Jäger grids. There are 5 layers of grids, which, with the top cover, give a depth of



Section of Purifiers—Ordinary System



Section of Jager Patent Purifier.

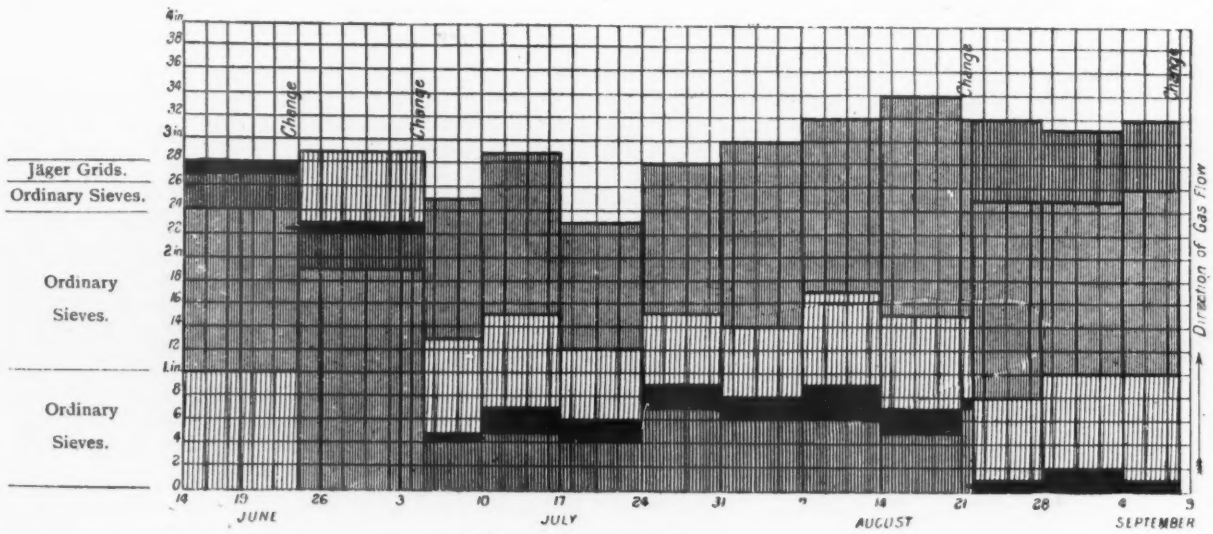
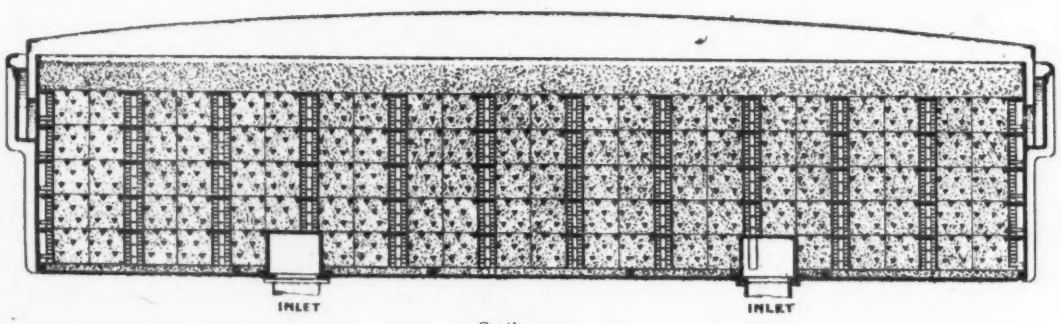
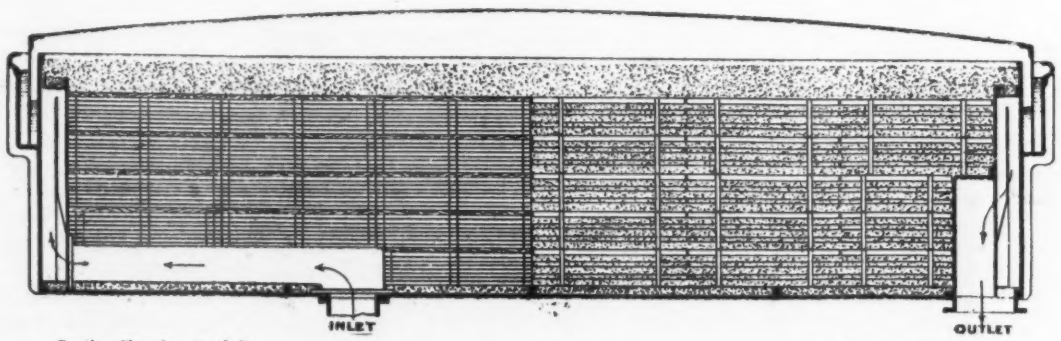


Diagram of Differential Pressure.



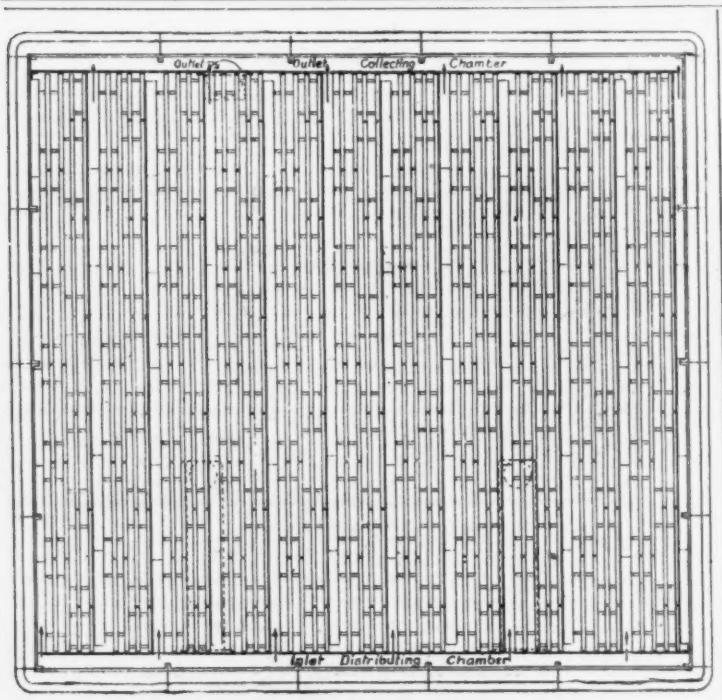
Section.



Section Showing Conduits.

Section Showing Grids.

eet of purifying material. The material and grids, divided by the inlet nd outlet conduits, are in 11 columns or walls, each 20 feet 10 inches n length by 4 feet 2 inches in depth. Each stream of gas represented y the inlet conduits is in contact with and passes through two of these alls. The contact surface is thus increased from 524 superficial feet 955 superficial feet—a difference of 82 per cent.—giving, with the maximum make of gas, a reduced speed of travel equivalent to 43½ per cent., that is, a speed of 0.013 foot per second instead of 0.023 foot per second in the ordinary purifiers. At the same time, the effective purifying mass is increased from 1,048 cubic feet to 1,598 cubic feet, or 52½ per cent., and, allowing for the partial efficiency of the covering layer, 80 per cent.



Plan.

It is self-evident that a mass of oxide 5 feet in depth, unbroken by any intermediate supports, must have a greater density at the bottom than at the top, and this would tend to cause the gas to travel by the line of least resistance and rush through the upper layers of material, leaving the denser lower layers only partly sulphided. But here the utility of the special form of grid known as the Jäger appears. I expect most of you are already familiar with the advertised description of it; so I will only call your attention to the portion of the diagram which is shaded to show the effect of the Jäger bars in preserving equality of density throughout the column or wall of material. Each layer of grids is separately filled with oxide, which is shovelled in and levelled off before the next layer is placed in the purifier. The oxide does not become consolidated, because the rows of bars are so arranged as to break up the mass into a series of vertical sections, which never exceed 10 inches in depth; and every portion of the stream of gas, having to pass through 6 of these sections, has the same density of material to encounter. Consequently, the resistance is uniform over the whole area of contact surface, and the sulphiding of the mass is equal throughout.

Until I had seen a Jäger purifier emptied, I was rather doubtful whether these conditions would be realized, or it would be found that some sections of material were more dense than others, and the sulphiding of the mass consequently irregular. But after having seen 9 changes of purifiers, I do not hesitate to say that the conditions are perfectly fulfilled—in every case we have found that the grids were thoroughly filled and the sulphiding of the mass was perfectly regular. The support afforded to the material by the grid-bars is apparent upon lifting the grids, when three-fifths of the material remains in the grid and is lifted with it from the purifier and shaken out into barrows for removal to the revivifying floor. The diagram on p. 885 shows the recorded back pressure thrown by the Jäger purifier compared with that thrown by the ordinary purifiers. The average for the Jäger is about 2-tenths.

The adaptation of the old purifiers to the new system is not a difficult matter. The standards supporting the T-iron bearers are taken out and the bolt holes in the bottom of the purifier filled up. The necessary inlet and outlet chambers are obtained by constructing curtains of steel plates attached to the two opposite sides of the purifier by channel irons. Each of these curtains has 5½ vertical slots extending the full depth and 1½ inches wide. The slots are about 4 feet apart, and arranged to be opposite the ends of alternate conduits; so that the stream of gas passing into an inlet conduit must travel right and left through a grid section to reach an outlet conduit. The inlet pipes are connected to the inlet chamber by cast iron hoods; and the old rectangular outlet pipe being removed, the outlet at the bottom of the purifier is connected to the outlet chamber by a shorter cast iron box, and still acts as the main outlet. These were all the structural alterations necessary, and only took a few days to carry out.

The question may be asked, "Do the results obtained continue to be satisfactory?" I will state the figures, and I think you will agree with me that they do. The average run during the winter season was formerly only 19 million cubic feet. The average run of the Jäger purifiers during the winter just passed was 29,024,000 cubic feet—an increase of 52.75 per cent.; and this, it must be borne in mind, with only 2 out of the set of 4 purifiers fitted with Jäger grids. But owing to the great reduction of back pressure in these two, I have been able to work all through the winter with full summer depth of material in the two ordinary boxes of the set. The average run of these also has been consequently increased to 24,384,000 cubic feet, an increase of 28 33 per cent. The average for the whole set this winter has been 27,035,000 cubic feet, as against 19,000,000 formerly, or an all-round increase of 42.28 per cent., due to the assistance of the two Jäger boxes; and there have been 18 changes of purifiers, as compared with 33 in the same period of the previous season.

[Report of Proceedings.—Concluded from page 849.]

TWENTY-FIRST ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

HELD AT PITTSBURGH, PA., MARCH 15, 16 AND 17, 1905.

THIRD DAY—MORNING SESSION.

The Association was called to order by the President at 9:30 A.M. Mr. Paul Doty submitted the following

REPORT OF COMMITTEE ON MEMORIALS:

PITTSBURGH, PA., March 17, 1905.

To the President and Members of the Ohio Gas Light Association:
Gentlemen—The address of the President, presented at the opening of your Twenty-first Annual Meeting, makes mention with regret of the passing from us in an earthly way of the following members:

Capt. J. H. Kauke, Wooster, O.; March 20, 1904.
Gen. Andrew Hickenlooper, Cincinnati, O.; May 12, 1904.
L. W. Wells, Canton, O.; July 4, 1904.
J. W. Gwynn, Bucyrus, O.; November 19, 1904.
J. A. Harris, Philadelphia, Pa., January 19, 1905.

The President says, "All of these were old and tried members, one of them one of the organizers and the first President of our Association. Their counsel and help will be greatly missed." To do justice to their memories the President recommended the appointment of this Committee.

Your Committee feels that something more than a brief biographical notice is appropriate to this occasion, in view somewhat of the sorrowful fact that the roll contains the name of your first President and distinguished Honorary Member, General Andrew Hickenlooper.

The history that is being made in the world to-day deals largely with the character of the Japanese people. A few days since Field Marshal Oyama, after winning undying laurels on the battle field of Mukden, made an address, so it is reported in the daily newspapers, to the spirits and souls of the dead soldiers who had laid down their lives in the battle, giving them praise for their sacrifices. It was a strong address, in beautiful, simple language and made a deep impression. The Japanese never think of an ancestor as having become only a memory. Their dead are alive. We present the thought to you, and it will be comforting to think that the spirit of General Hickenlooper, and of all the other honored members, are with us to-day, even as our thoughts are with them.

In Japan, foremost among the moral sentiments of one of their forms of religion for the dead is that of loving gratitude to the past. Their attention is directed to the work of the dead, either the visible work that makes the heart beat a little faster than usual when looking at it, or the results of their thoughts and deeds in relation to the life of their times. They do indeed find interest in the records of some individual lives that left large marks in history; their emotions are stirred by the memories of their great captains and leaders.

May not we of the Western Hemisphere learn something from Oriental Japan of their feeling toward the dead of grateful and reverential love? This feeling is probably the most profound and powerful of the emotions of their race, that which especially directs national life and shapes material character. Patriotism belongs to it; family love is rooted in it; loyalty is based upon it. The Japanese say, "Never must we cause shame to our ancestors. It is our duty to give honor to our ancestors."

The teaching of evolution is that each of us is many, yet that all of us are still one with each other; that we must know all past human

not only in ourselves but likewise in the preciousness and beauty of every fellow's life; that we can best love ourselves in others; that we can best serve ourselves in others.

The dead have left us the record of all they were able to learn about themselves of right and wrong, and sorrows and happiness; about the error of selfishness, the wisdom of kindness, the obligation of sacrifice, For this bequeathed knowledge, may we not say, like the Shinto believers, "Ye forefathers of the generations and of our families and of our kindred, unto you the founders of our homes, we utter the gladness of our thanks."

CAPTAIN J. H. KAUKE, one of the organizers of the Wooster (O.) Gas Company, and its President at the time of his death, died at his home in Wooster, the morning of Sunday, March 20, 1904. The deceased was in his 87th year, having been born in Wooster township, O., December, 15, 1817. Despite his advanced years, his vigor and health would seem pretty well illustrated through the remark that he attended the last session of the Ohio Gas Light Association, held in Cleveland the week before his death. No silver spoon was his in babyhood, nor was indolence the portion of his youth, but rugged health, a sharp intellect, honesty of purpose and well pursued methods brought him wealth, the respect of his fellow townsmen and the affection of his intimates. Although much more largely concerned in other business enterprises in Ohio, his particular pet was the Wooster Gas Light Company, and his rugged personality was one well and favorably known to the fraternity of the State. He was an active member of the Ohio Gas Light Association and seldom missed one of its meetings. He was a member of the Board of Trustees of the University of Wooster, which Institution he helped to found in 1866.

GENERAL ANDREW HICKENLOOPER.—While for more than a year it was known that the health of General Andrew Hickenlooper was in such a precarious state that his death might be reported at any moment, it is nevertheless true that the final word found those who knew him unprepared for the last message. The General passed away peacefully, at his home in Cincinnati, on May 12th. His death marks the end of a natural life that was complete for work well done in many and varied ways, and out of them all shines best his services to the gas industry of America. Born August 10, 1837, his almost three-score-and-ten span makes a book the like of which is seldom written of any man. A report of the action taken by the Cincinnati Gas and Electric Company respecting the thought and sentiment of his associates was published by most of the technical journals at the time of his demise, and the recital of an authentic record of his career would read like a compendium of the gas business of the country, the development and upholding of which can be said to have been his guiding star.

LEVI W. WELLS, Superintendent of the Canton (O.) Gas Light and Coke Company, passed away at his home, 1452 North Cleveland avenue, Canton, O., the afternoon of July 14th, 1904. Mr. Wells was born in New Brunswick, Canada, March 9th, 1847, and early in life came to the States, engaging in the gas business first in Marblehead, Mass., and later on in Roxbury, Mass. In 1891 the American Gas Company offered him the position of Superintendent of its Canton property, and death found him in such charge. His administration of the Canton Company's affairs was in every respect successful. He is survived by his widow, two brothers and two sisters.

JOHN WILLIAM GWYNN was born in New York City, May 10, 1849, and lived to the age of 55 years, 6 months and 9 days. He was the oldest child of John Gwynn, a native of London, and Jane Ferris Gwynn, who was born in Fermanagh county, Ireland. The father was a maker of percussion caps, and was also a gas maker. John W. Gwynn worked with his father in these pursuits in New York and Brooklyn, Albany, N. Y., and Plainfield, N. J. The family removed to Tiffin, O., in 1862, and that city has since been regarded as the family home.

As Mr. Gwynn grew to man's estate he devoted his entire attention to gas making, adding later electric lighting when that system came in vogue.

In the autumn of 1886, Mr. Gwynn accepted the position of manager of the Bucyrus Gas and Electric Light Company, a position which he held until August 1st of last year. During his 18 years' residence in that city Mr. Gwynn became one of the best known of its citizens, and he commanded the unquestioning confidence of all who knew him.

I will ask you, Mr. McIlhenny, to pay a tribute to the memory of Mr. J. A. Harris, who departed this life, the 19th day of Jaunary, 1905.

Respectfully submitted,

PAUL DOTY, Chairman.
EUGENE PRINTZ,
IRVIN BUTTERWORTH,
} Committee.

On motion the report of the Committee on Memorials was accepted and ordered spread upon the minutes.

Mr. John D. McIlhenny, Philadelphia, Pa.: Mr. Chairman and Gentlemen: I have been requested to say a few words by way of tribute to the memory of our deceased friend and member, Mr. J. A. Harris. Mr. Harris was a man who was identified with the gas industry through the meter business all his life. He lived in Pennsylvania. He was born on the Western Shore of Maryland. I have been unable to obtain any exact data as to his age or the date at which he joined the various Gas Associations of which he was an honored and a valued member. He was a man of whom it may be truthfully said that he had no enemies. He was uniformly good natured. It seems to me that upon the winding up of a man's life, if it can be said that he so conducted himself as to have the good will of everyone with whom he came in contact, that in and of itself portrays most forcibly the character of the man and shows most graphically the estimate in which he was held by those who knew him. I think we are often too apt, as we go through life, oftentimes unnecessarily, to say and do things which might as well have been left unsaid and undone. I feel from what I know of Mr. Harris, that he never made anyone feel uncomfortable, and that it was a rule of conduct with him to follow as nearly as he could the golden precept, "To do unto others as you would that others would do unto you."

Mr. Persons—Mr. President, I feel that I knew Mr. Harris probably as well as anybody present and I do not want to let this occasion pass without adding my tribute to his life and character. "Joe." Harris was a man whose heart was a great deal better than his head. As Mr. McIlhenny has well said he had no enemies. Everybody loved him who knew him. I first became acquainted with him in a business way in 1881 or 1882. I afterwards went with the old firm of Harris, Griffin & Company, and from that time on we had been intimate friends. I did not learn of his death until I came to this meeting. Mr. Harris married rather late in life. He had a child, which grew to the age of 6 or 7 years. Of course, his heart was centered in that child. Unfortunately, however, a few years ago the child died, and "Joe.," from that time on, was a broken man. Mr. Harris was a man of exceedingly kindly and generous disposition and to know him was to love him.

Mr. Doty—Mr. President, I would like to call attention to the fact that of the charter members of the Ohio Gas Light Association it is reported to me that but few are present at this meeting. Mr. Butterworth and Mr. Printz, I believe, are the only charter members present to-day. In view of this close relationship between General Hickenlooper and the charter members of this Association, it would seem to me appropriate that the other members of the Committee add their testimonial to the formal testimonial of the Committee and pay their tribute to the memory of General Hickenlooper.

Mr. Butterworth—Mr. President, I had not expected to say anything in this connection aside from the tribute contained in the report of the Committee on Memorials. I wish I could say something that would do the subject justice and would demonstrate the esteem in which I hold our departed friends. Those who knew General Hickenlooper personally I am sure will agree with me that it was a privilege to know him and to observe his methods in handling the affairs of his Company. It was an inspiration and a help to all of us to observe the methods which were peculiar to himself. There was a mark of individuality about all that he did. He was a great General. In conducting the gas business in Cincinnati some of the methods which he employed were unique. He was a "hard hitter," and when he addressed himself to a task on behalf of his Company or on behalf of the gas industry as a whole he always handled it in a masterly manner. The mass of data that he would gather and compile on any given subject in defense of the gas business, or in defense of his individual Company, was simply overwhelming. The pamphlets that he had issued from time to time every gas man should have in his library for his information and assistance. His pamphlets on fuel gas, I believe, are of special value. I remember he had compiled a lot of statistics as to fires caused by oil lamp explosions and gasoline stove explosions, which were simply astonishing in mass and scope. In these respects he was certainly a master. General Hickenlooper was naturally a leader and his individuality was stamped upon any business or movement with which he was identified. I do not think, however, that I can say anything adequate as to General Hickenlooper's qualities aside from what is said in the report of the Committee, except that I appreciated him personally, and the more I had opportunity to observe his methods and study his character the more I learned to admire him.

The President—If I may be permitted to add my testimony to those

who have already preceded me I would say that I admired General Hickenlooper probably as much if not more than any other man I came in contact with connected with the gas industry. I admired particularly his force, his vigor and his ability to do things. The idea that has been recently advocated that a man should retire from business when he was 40 years of age and should be chlorformed when he was 60 years of age, would certainly not hold good in the case of General Hickenlooper. If that had been the case with him then certainly the gas industry would have been deprived of one of its best men just in his prime. I can say, as Mr. Butterworth has said, that the literature which General Hickenlooper put out on various subjects connected with the gas industry has been and will be of great benefit to all persons connected with that business. I remember at this time particularly a paper which he prepared on "Fuel Gas," and his paper read before the Ohio Gas Light Association on "Street Lighting." They were two of the most complete papers we have ever had presented to us. I was also very much pleased to know and to feel on my own account that General Hickenlooper was never too busy apparently to give a man help when he needed it, on any feature connected with the gas business. If I wished any information or desired to know anything that was within his power to furnish me, notwithstanding the fact that he was a very busy man, he was always willing and apparently glad to do anything he could to assist me. He was a very broad-minded man. He was a public-spirited man. While he devoted most of his time to the advancement of the interests of his Company in Cincinnati, yet he was continually doing a great deal for the advancement of the business in general. I feel that no testimonial that I could give him would be too great. Owing to the motion having been adopted that the Committee on Next Place of Meeting should not report to this Association until after the meeting of the Western Association, there will be no report from that Committee this morning. The next order of business will be the

REPORT OF THE COMMITTEE ON NOMINATIONS.

This was read by Mr. F. R. Persons, as follows:

To the Ohio Gas Light Association: Gentlemen—Your Committee on Nomination of Officers begs leave to recommend the election of the following:

For President.—Mr. Donald McDonald, Louisville, Ky.

For Vice-President.—Mr. Benjamin W. Perkins, South Bend, Ind.

For Secretary and Treasurer.—Mr. Thomas Clive Jones, Delaware, O.

For Members Executive Committee.—Messrs. J. D. Shattuck, Chester, Pa., and Henry I. Lea, Pittsburgh, Pa.

For Editor Novelty Advertising and New Business Methods Department.—Mr. George Williams, Madison, Wis.

For Editor Wrinkle Department.—Mr. William E. Steinwedell, Cleveland, O.

F. R. PERSONS,
FRANK W. FRUEAUFF,
J. D. SHATTUCK,
} Committee.

Mr. Persons—In connection with this report, and before it is acted upon, I wish to say that there seems to be a feeling that the Secretary and Treasurer (who unfortunately is still sick from an attack of pleurisy) should receive a larger compensation. I, therefore, move that he be allowed $250 a year in addition to his present salary for services of a clerk and a stenographer. This is almost absolutely necessary on account of the increased membership and the consequent increased work.

The above motion being duly seconded, was unanimously adopted.

The President—You have heard the report of the Committee on Nominations. What is your pleasure.

Mr. Butterworth—I move that the gentlemen who were nominated by the Committee be declared duly elected to the respective offices to which they were nominated, and that the Association authorize the President to cast our ballot for their election.

ELECTION OF OFFICERS.

The above motion being duly seconded was unanimously adopted, and President Stone thereupon cast the ballot of the Association for the election of the various nominees to the respective offices as recommended in said report.

SOME RESPONSES.

Mr. Donald McDonald, the newly-elected President, was then called upon and said: Mr. President, I appreciate the honor that the Committee and the Association have conferred upon me. I am also keenly sensible of the responsibility. The Ohio Association has cut out for itself a very rapid pace and that pace must not be allowed to slacken. If I thought that the maintenance of that pace depended upon the President I would not undertake the responsibility; but it depends upon the members. We must go ahead to get into our Association as many new members as possible, bearing in mind, however, that it is not members alone we want, but that we also need loyalty, faithfulness and earnest co-operation. A gas association may be likened unto a co-operative library. If each man brings one book to that library, then all have access to a thousand volumes. In this Association we want men who know enough to bring one book, even if it is a very small pamphlet, and who are earnest enough to avail themselves of the 999 volumes brought in by the other members. We also want a membership who are willing when they come to the Association to regard it as an earnest undertaking and not an opportunity simply for a social good time or merely for three days of amusement. I think one of the dangers of an Association of this kind, and one which we should guard against, is allowing the social side and the entertainment and amusement features connected with our annual gatherings to so encroach upon the technical and business side as to divert the attention of the members from the earnest work in which we should actually engage in order to secure all possible benefit from these meetings. As far as my influence goes for the one year in which I shall hold the reins, I will endeavor to see that this is not a mutual entertainment society, but that it is what its name indicates, to wit, a Gas Association; and that its principal object is the promotion, first of all, of the gas industry, and secondly, the Ohio Gas Light Association. When I put them in that order, gentlemen, I do not mean any disloyalty to the Association, but we should remember that the Association exists for the benefit of the industry and not that the industry exists for the benefit of the members of the Association. I again thank you, gentlemen, for the honor conferred upon me, and assure you that I fully appreciate it.

Mr. Benjamin W. Perkins, the newly-elected Vice-President of the Association, then being called upon, said: Gentlemen, this nomination and election came to me like a "Clap of thunder out of a clear sky." All I can do is to reiterate Mr. McDonald's remarks. If I thought the success of the Association depended upon the Vice-President, I certainly should decline the honor. But it is indeed a great pleasure to receive the nomination and election to the office of Vice-President of an Association of this kind, which is known "to do things." I am proud of it and I thank you for the honor conferred upon me.

The President—There was a special committee appointed to take up the question as to the advisability of changing the name of our Association. Mr. McDonald was Chairman of that Committee and I will now call upon him for the report of the Committee.

Mr. Donald McDonald, Ky., then submitted the following

REPORT OF COMMITTEE ON PROPOSAL TO CHANGE NAME:

To the Ohio Gas Light Association: Gentlemen—Your Committee recognizes that the time has fully come when this Association should take a name which will express more nearly the national character of its aims, its scope and its membership. A movement is already on foot for the formation of an Association which shall represent or comprise all of the gas men of North America. The members of this Association are fully in sympathy with this movement, believing it to be for the best interests of the gas industry. Your committee feels that the use of a broader name at this time may to some extent hinder this larger movement.

We, therefore, recommend that the Executive Committee be authorized to select and report a suitable name to the next meeting of this Association, provided that in the judgment of the Committee it is expedient to do so.

DONALD MCDONALD, Chairman,
H. EUGENE PRINTZ,
IRVIN BUTTERWORTH,
} Committee.

On motion the report of the Committee was adopted.

Mr. McIlhenny—I would like to inquire what the by-laws provide with reference to this subject. If I am not mistaken in order to change the by-laws a resolution must be presented at one meeting and acted upon at the next.

Mr. McDonald—I would say that the Committee had that by-law in view when it drew this report. The by-laws do not require that the proposed change be suggested at one meeting, and then to be carried forward to the next meeting but only that the change be considered by the Executive Committee and reported to the Association in their regular report the first day of the next meeting. So that by the time our next meeting assembles, if the Executive Committee feel that a change of name is wise and agree upon a suitable name then they can

legally report that name to the Association at the next meeting and we can formally adopt it at that time.

Dr. H. B. Harrop, then read the following

REPORT OF COMMITTEE ON FINAL RESOLUTIONS:

To the Ohio Gas Light Association: Gentlemen—The Committee on Final Resolutions has the following report to make:

Whereas, The Twenty-first Annual Meeting of the Ohio Gas Light Association has been exceptionally profitable, and will be marked among recent meetings of the Gas Associations for the unprecedented volume and character of the papers, reports and discussions; and,

Whereas, The meetings and the interims have been pleasant in every way and marred by no single regrettable incident, but show that the most careful and painstaking thought has been given to our welfare and comfort; it is

Resolved, That we make tender of our thanks to the officers of the Association and to all those whose unselfish labor has enriched the proceedings; and it is further

Resolved, That the sincere thanks of the Association are due to the James Gardner, Jr, Company; the Superior Manufacturing Company; the Phoenix Glass Company; the Manufacturers' Light and Heat Company; the Keasby-Mattison Company; the Equitable Meter Company; the Union Natural Gas Corporation; the Pittsburgh Light and Manufacturing Company; the National Tube Company; the Pittsburgh Meter Company; the Westinghouse Machine Company; the Reineke, Wilson Company; the Ruud Manufacturing Company; the Monarch Water Heater Company; the American Meter Company; the Welsbach Company; the Hammon Coupler Company; the Carnegie Natural Gas Company; the Monongahela Tube Company; the Edgar M. Moore Company; the Riter-Conley Company; the Chapman-Fulton Company; the Pittsburgh Coal Company, and the Philadelphia Company, Guarantors, and the Secretary is instructed to forward to each of the above named guarantors a copy of this resolution.

H. B. HARROP, Chairman,
JAMES T. LYNN,
GEORGE H. TAYLER,
} Committee.

On motion the report of the Committee was adopted and ordered spread upon the minutes.

The President—Before we adjourn I would like to express my thanks to the Secretary, Mr. T. C. Jones, for the very efficient help he has rendered me during the past year and also to the members of the Association for their loyal support. As Mr. McDonald has said the President does not count for anything. He is simply a figurehead. The Association cannot succeed without the earnest support of its membership. I feel that whatever credit may be due to anybody for the work of the Association the last year is entirely due to the members because of their willingness to work, their spirit of fraternity and helpfulness, and I wish at this time to express to each and all of you my thanks for assistance rendered.

Mr. Doty—Since the report of the Committee on Nominations was presented, a gentleman has entered the room, who we all know is most largely responsible for the successful work of the Ohio Gas Light Association. I think it would be an appropriate time to advise that gentleman of the fact that he has been re-elected Secretary and Treasurer of the Association. He probably did not expect the honor, but nevertheless the honor has been thrust upon him. We know and regret that he has suffered a severe illness during the sessions of this meeting and we are all very glad to know that he has recovered sufficiently to be with us again this morning. I refer to Mr. Jones, and suggest that he be called upon for a speech. (Applause.)

The Secretary then said: Mr. President and Fellow Members of the Ohio Gas Light Association, I was not aware, until I came into the room a few moments ago, that I had been re-elected to be Secretary and Treasurer of your Association. I can simply say that I appreciate the honor and thank you heartily for it. However, from the smoothness with which the meeting has been conducted during my illness, I am led to believe that you do not really need a Secretary. I believe, gentlemen, yesterday was the first time you could accuse me of being absent from the post of duty, and I sincerely hope it will never happen again. I thank you. (Applause.)

It was ordered that the Committee on Next Place of Meeting be continued so that it might report at the next meeting.[1]

1. The Committee, on the adjournment of the meeting of the Western Gas Association, named Cincinnati as the next meeting place.

The President—We are all conscious of having done many things we ought not to have done, but if we have left anything undone that we should have done, now is the time to call it to our attention. If not, a motion for adjournment is in order.

On motion the Twenty-first Annual Meeting of the Ohio Gas Light Association was declared adjourned.

Duplication of Electrical Apparatus to Secure Reliability of Service.

By MR. H. W. BUCK.

The question of the proper reserve in an electrical installation is a problem that, like many engineering problems, must be settled largely upon a basis of cost. It is nearly always a question involving a balance between a power company's obligation to its customers and the obligation to its stockholders. From the standpoint of the consumer the more reserve the surer will be his supply of power. On the other hand, as to the power company's stockholders the less the investment in reserve the larger the dividends, unless the reserve has been cut down to a point where the power company's reputation is endangered by interruptions to service. The question is purely a practical one and no definite laws can be enunciated, nor can any curves be plotted which will indicate the proper amount of reserve to be installed under various conditions. The decision in each case must be based on intimate knowledge of the local conditions and requirements of the particular installation in question. All that will be attempted in this paper will be a discussion of the general principles involved.

For purposes of discussion electrical reserves may be divided into several classes of apparatus, each governed by different conditions. These classes are:

1. Generating units.
2. Generating plant switchboard.
3. Generating plant transformers.
4. Underground distribution system.
5. Overhead lines.
6. Sub-station apparatus.
7. Apparatus on premises of individual customers.

Reserve apparatus applicable to the above can again be divided into two classes.

a. Actual apparatus installed complete ready for service.
b. Reserve parts held in storeroom.

Generating Units.—There is no place in a power system where reserve apparatus is so important as in the generating station. In the writer's opinion the following conditions should be observed in every large generating plant where continuous service is demanded; the maximum overload capacity of the generators normally operating on the bus-bars should be such that at any time and under any conditions of load anyone of the generators can be instantly disconnected from the bus-bars without necessitating a reduction of station load or causing a serious momentary drop of pressure. If any trouble, either incipient or actual, should then develop in one of the generating units, the unit can be immediately put out of service without waiting to start up another machine to take its place. Furthermore, there should, if possible, be one unit held as absolute reserve which need not be operated except as a substitute. This enables any one generator to be out of service for repairs, even during load peaks. The size of generating unit selected for an installation has an important bearing on the question of reserve. The larger the unit the lower the cost of the plant per kilowatt, but, by necessity, the larger will be the investment in the idle reserve machinery. The proper relation can only be determined by a study of the local conditions under which the plant is to operate.

A station operated by steam turbines or by water power has certain advantages in reserve conditions. With steam turbo generators, on account of the comparatively high part load efficiency of the steam turbine, all the units installed in the plant, including the reserves, can be kept in operation on the bus-bars at all times without serious sacrifice in steam economy due to the part load on each unit. This enables a generator to be quickly disconnected from the bus-bars at any time without overloading the remainder, or causing a serious drop in pressure. This condition also obtains in a water power plant since the additional use of water caused by the continuous operation of the reserve units has only little effect on the cost of producing the power. With

a reciprocating engine, however, each unit must be operated as far as possible at exactly the full load point on account of the economy required in steam consumption. This prevents obtaining the full utility of the reserve machines.

The exciters in an alternating current generating station are, of course, the heart of the entire system, and the most careful provision should be made to insure continuity of service therefrom. Since the cost of the exciters is in every case only a small proportion of the cost of the plant there is little excuse for not installing ample reserves in connection with the exciter equipment.

Of equal importance with the complete reserve machinery installed is the stock of reserve parts held in the storeroom. There should be kept on hand at all times ready for immediate use a complete outfit of the parts of the prime movers and generators which are most likely to wear out or break down.

Generating Plant Switchboard.—Under this heading might be included all of the electrical equipment of the station from the terminals of the generators to the point where the outgoing feeders leave the power house. This will necessarily involve a large amount of cable as well as all of the switch equipment and controlling appliances. Here the question of reserve is almost wholly a storeroom proposition. In the writer's opinion, the actual installation of duplicate cables in the station wiring and duplicate switches, controlling devices, etc., should be avoided as far as possible, as tending to occupy too much valuable space and to complicate the organization of this vital part of the plant. There should, however, be kept on hand, preferably in the power house itself, the fullest inventory of switch parts which are liable to injury, and full lengths of all sizes of cable used in the installation. The duplication of bus-bars is, of course, quite necessary in a generating plant, but more for reasons of flexibility of operation than for reserve. Bus-bar installations as now constructed are less liable to breakdown than almost any part of an electrical system. A great deal can be accomplished toward reserve in the case of switchboard equipment by keeping on hand a suitable outfit of jumpers with proper terminals soldered on to use for emergency connections to temporarily transfer feeder or generator leads from one switch to another.

Generating Plant Transformers.—Many of the considerations involved in the generating units enter into the question of duplication for reserve in a transformer equipment. Here also in regard to the size of unit selected a proper balance must be established between the saving in cost per kilowatt by the adoption of large units and the saving in investment in reserve transformers by the installation of smaller ones. Another important question has recently been brought up in connection with transformer plants by the introduction of one polyphase transformer as a substitute for 2 or 3 single-phase transformers for a bank. A polyphase transformer occupies less space and costs less than a bank of single-phase transformers, but when reserve is considered it is not so good. If a bank of separate single-phase transformers breaks down the trouble is not likely to involve more than one of the component transformers and this can be replaced by a small kilowatt reserve. If, however, a polyphase transformer breaks down, capacity equal to its full polyphase rating is put out of service.

In the writer's opinion all important transformer stations should have a complete spare bank which can be shut down at any time without overloading the remaining transformers, and in addition one single-phase transformer should be held in stock to make good any bank in case one of the component transformers should break down.

Overhead Distribution.—If there is a single element in an electrical system where trouble is sure to develop sooner or later it is on the overhead lines, and the higher the pressure the more likely is the trouble to occur. This is so because the overhead lines are subjected to influences over which the power company has no control. These influences are principally lightning, general abnormal weather conditions, malicious interference, and accidental interference caused by the contact of other companies' wires during construction work. For these reasons it is practically out of the question to attempt to maintain a continuous power service over a single circuit overhead line. There should always be enough circuits installed so that at least one can always be shut down without necessitating a reduction in load. This is especially true in the case of high pressure lines. In low pressure systems of 2,300 volts or less it is nearly always possible to replace insulators and do other work on the line while it is "alive," but at higher pressures this should not be allowed if there is any regard for human life. In many plants where important interests are dependent upon the power transmitted the matter of duplication should be carried beyond the circuits and reserve pole lines installed. Carried to its limit without regard to cost, the ideal condition would be a number of single circuits each installed on a single pole line and each line following a different route. With this arrangement lightning would not be likely to disturb more than 1 line at a given time, and a complete shut-down from malicious interference involving all the lines, would be very improbable. The cost, however, in such a separation of lines would in most cases be prohibitive on account of purchase of right of way, patrolling, etc.

Underground Distribution.—When trouble develops on an overhead line the location of the breakdown can usually be quickly found by patrol and repairs made without delay. In an underground feeder, however, the conditions are radically different. Breakdowns are difficult to locate and when found repairs frequently occupy many hours on account of the necessity for pulling out the defective cable from the ducts, putting in new cable and resplicing. Duplicate or triplicate cables should always be installed where important service is involved. This obligation is conceded by most engineers, and spare underground cables are usually installed. The installation, however, is apt to be carried out in such a way that the security of the reserve cables is impaired. Underground conduits as now generally constructed consist of a congested mass of ducts grouped in such a way that in the manholes the cables are crowded closely together and all in constant danger of destruction in case of a violent short circuit in the manhole. There is little value in installing spare cables when they are liable to be damaged at just the the time when they are most urgently required. Such risk can only be obviated by constructing electrical conduits in such a way that the cables can be separated in the manholes by short circuit proof barriers. Preferably, whenever possible, duplicate conduits should be constructed on opposite sides of the street, or still better, laid through different streets. Only by such precautions can the full benefit of the reserve cables be insured.

Sub-Station Apparatus.—The general considerations which apply to generating plant reserves also apply to outlying sub-stations but in a less degree, for the complete shut-down of a sub-station involves only a portion of the power system. Farther out on the power network to the plants of individual customers, where the transformer or other apparatus is supplied by the power company, no reserve seems necessary under the ordinary obligations of such cases. If a breakdown occurs only the individual is inconvenienced, and, therefore, the risk is usually justified.

Some Experiments on the Fuel Value of Bituminous Coal Ashes.

By Henry Fay and F. W. Snow, in *Jour. Am. Chem. Soc.*

During the winter of 1902-3, when the scarcity of coal was so great, it was considered desirable to know the exact amount of unburned coal, which was being thrown away in our ordinary soft coal ashes. From some experiments carried out, under the direction of and reported upon by the late Col. Waring,[1] the amount of unburned coal seemed to him large enough to warrant the city in recovering this coal, and he also recommended various uses for the ashes. By means of a specially constructed small boiler, built on the order of a Rumford calorimeter, measurements were made of the unburned coal in the ash. The amount of waste coal in ashes examined varied from 20 per cent. to 40 per cent. by weight. If the ashes from the tenement house district be included, the average would fall to about 20 per cent. It is further estimated, that on this average there would be lost about 125,000 tons of coal for every 1,000,000 cubic yards of ashes. These numbers seem to show such an appalling loss that it seems highly desirable to subject the question to further experiment. As the method for determining these values was not strictly accurate, it was decided to repeat some of this work in such a way that the personal element was reduced to a minimum, and to express the results in terms of standard value.

In order to test the fuel value, ashes were obtained from four sources; *viz.*, the Rogers building heating plant of the Massachusetts Institute of Technology, the Edison Electric Co., the Hotel Berkely, and from a large packing house in which was used a mechanical stoker. These four samples will be referred to as A, B, C and D respectively. Starting with barrel lots, each one was carefully weighed, and was then subjected to a screening process, in order to classify the material into coarse, medium and fine ashes, so that in case there was enough coal in any one of these products to warrant its recovery, a commercial extraction might be developed. These separate lots were weighed, and then sampled by coning and quartering. The final sample in each lot was

1. Report of the Department of Street Cleaning of the City of New York, 1895-97.

then crushed and powdered, and from this material the calorific value was obtained. In this way the calorific value of samples from the coarse, medium and fine ashes was obtained, and represented a true average on the whole.

All determinations were made in a Mahler bomb with all the precautions necessary for accurate work, with the exception, that no corrections were made for sulphur compounds, which may have been in the ash, nor in the coal, which it was necessary, in some cases, to add. The values, which are given, therefore, are not, strictly speaking, absolute values. The corrections which would be necessary, however, would be exceedingly small, and the values given are not far from the actual truth. As all experiments were carried out under the same conditions, the values are strictly relative. Attempts were made at first to burn the ash direct, but this was successful with the richest products only. In the poorer products there was some combustion, but the heat developed was sufficient to soften the slag, which formed a glassy mass, protecting the unburned part from further action of the oxygen. On account of this difficulty, it was found necessary, in each case, to add a weighed quantity of standard coal, and to burn this with the ash. A blank determination of the calorific value of the coal was made before each determination of the ash, and knowing the number of calories contained in the coal, the difference represented the number of calories in the ash.

The following table shows the results obtained in the screen analysis, and the value in calories of the various products. It will be noticed that the percentages given are obtained from comparison with a coal giving 8,500 calories, instead of the actual fuel value of the coal from which the ash was obtained. This was considered desirable, since it was necessary, in some cases, to add such coal to the ash, in order to make a perfect combustion.

Sample.	Screen Analysis.	Weight in Kilos.	Percentage Weight.	Total Calories.	Calories pr. Gram.	Percentage of Unburned Coal Compared with a Coal Giving 8,500 Cals.
A	On 1-inch mesh..	16.2	49.85	1,320.3	81.5	0.96
	Through 1 on 2..	9.4	28.92	2,596.3	276.2	3.25
	" 2.....	6.6	20.31	1,840.1	278.8	3.28
	Loss.....	0.3	0.92	....	....	....
B	On 2-inch mesh..	20.5	44.4	45,811.5	2,234 7	26.29
	Through 2 on 4..	14 1	30.5	24,648.2	1,748.1	20.51
	" 4.....	11.5	24.9	10,574.2	919.5	10.82
	Loss.....	0.1	0.2	....	....	....
C	On 1-inch mesh..	4.8	11.4	2,674.1	557.1	6.55
	Through 1 on 2..	8.1	18.9	4,770.1	588.9	6.93
	" 2 on 4..	8.6	20.0	4,767.8	554.4	6.52
	" 4.....	20.8	48.6	....	....	....
	Loss.....	0.5	1.1	....	.. .	....
D	On 2-inch mesh..	33.0	23.86	35.805.0	1,085.0	12.76
	On 4-inch mesh..	39.7	28.71	83,688.0	2,108.0	24.80
	Through 4	65.4	47.28	101,370.0	1,550.0	18.24
	Loss.....	....	0.15	....	....	....

It will be seen from an inspection of the table that in two of the samples the value in coal approaches the results reported upon by Col. Waring, and in these two it is not uniformly distributed in the different sizes. In sample B the highest values are obtained with 26.29 per cent. in the coarse material, which was composed largely of black clinker, holding mechanically inclosed coke and coal. This appearance was also characteristic of the smaller sizes of this sample, indicating a fairly poor coal to start with and considerable neglect on the part of the fireman. While the amount of unburned coal actually present seems high, judging by the figures which were obtained, it does not seem to be in a form which would make it worth while to save. Instead of existing in the form of separate pieces of coal, most of it was in the form of coke, adhering firmly to and partially fused into the clinker. A more careful fireman certainly could have decreased this value very considerably. In sample D the material on the 2-inch mesh also shows a high value. This is, however, to be traced directly to the character of the slag, which is formed on heating. The clinker melts at a low temperature inclosing coal and coke, and falls through the grate in the form of round pellets of slag. In this material there is apparently no coal, and judging alone from the appearance, it would be pronounced free from it, but on breaking open the shell of a pellet, there is invariably some coal inclosed. This material would not appear to have much value, notwithstanding the high percentage of unburned coal found.

Sample A represents the average run of ash from a good grade of Pocahontas coal. It was taken from the middle of 3 grates. The ash from the top grate consists only of very coarse clinker, while that from the lower grate contains only very fine ash, both, judging from the appearance only, apparently free from coal.

The material used in this work represents only a very few of the large types of plants, and consequently it would be unwise to draw from the results any definite conclusions. It is believed, however, that the results represent something near the average. In the cheap tenement districts there would undoubtedly be found very little coal because of the scrutiny with which the ash is sifted and picked over. On the other hand, from the private residence and apartment house district, where the waste is larger and where there is little or no attempt to work over the ashes, the average would probably be higher than the results reported here.

The average per cent. of unburned coal for each sample is, respectively, 2.49, 19.20, 6.66 and 18.60, and the average for the 4 only 11.98. This is very considerably lower than the average values reported upon by Col. Waring, and it is believed that the expense of collecting and working the material of this kind would exceed the profit on the recovered product, unless the recovery was done in connection with some scheme for the utilization of the clinker and fine ash.

This conclusion, however, should be accepted only as tentative, as it would be necessary to use a much larger series of samples, not only of bituminous, but also anthracite coals for a final decision of the question.

The Next Meeting of the Mechanical Engineers.

The 51st meeting of the American Society of Mechanical Engineers will be held at Scranton, Pa., on June 6 to 9, inclusive. During the convention the society's headquarters will be in the Hotel Jermyn, and the professional sessions will be held at the Young Men's Christian Association Building. The first session will be opened on Tuesday evening, June 6, with an address of welcome by William F. Mattes, chairman of the local committee, and a response by J. R. Freeman, president of the society. The remainder of the meeting will be devoted to considering the following papers: "The Transfer of Heat at High Temperatures," by F. C. Wagner; "Standard Unit of Refrigeration," by F. E. Matthews; "Formation of Anchor Ice and Precise Temperature Measurements," by H. T. Barnes; "Some Types of Centrifugal Pumps," by Wm. O. Webber.

Matters of business will be attended to at the Wednesday morning session and will be followed by the presentation of professional papers as follows: "Microstructure and Frictional Characteristics in Bearing Metals," by Melville Price; "Cast Iron, Crushing Loads and Microstructure," by Wm. J. Keep, and "Smoke and Its Abatement," by Charles A. Benjamin.

Wednesday evening the papers presented will be: "Can a Steam Turbine Be Started in an Emergency Quicker than a Reciprocating Engine of the Same Power?" by A. S. Mann; "Note on Efficiency of Steam Generating Apparatus," by A. Bement; "Performance of a Superheater," by A. Bement; "Counterweights for Large Engines," by D. S. Jacobus, and "Steam Actuated Valve Gear," by Wm. H. Collier.

At the closing session, Thursday morning, the following papers will be presented: "Note on Heads of Machine Screws," by H. G. Reist; "Belt Creep," by W. W. Bird; "Function of Laboratory Courses in the Curriculum of Engineering Schools," by Charles E. Lucke; "Continuous Measuring and Mixing Machines," by E. N. Trump, and "Epochs in Marine Engineering," by Rear Admiral George E Melville.

The concluding function of the meeting will be a reception to the members and guests of the society, given by the local members of the American Society of Mechanical Engineers together with the Scranton Engineers' Club, the Board of Trade and the citizens of Scranton. A number of excursions have been planned to various points of interest in and about Scranton for the afternoons.

Notes on the Care and Management of Dynamos.

By "W. J. H.," in *Electrical Engineer.*

A most important element in the efficiency of dynamos and motors, and one which makes considerable difference to their lifetime, is the care with which they are treated, and the immediate remedy of any fault or irregularity that may appear in them. It requires a certain amount of experience to be able to detect these faults and irregularities as soon as they occur, and also to know the proper steps to be taken to correct them before the damage becomes at all serious or has time to deteriorate the machine.

In many cases a breakdown or failure in a dynamo may be traced to negligence or carelessness pure and simple. Dynamo machinery cannot withstand ill-usage and overloading, although motors generally increase their output in proportion to the demand made upon them until a certain limit. If intelligence and common sense are used, a capable

engineer should have no difficulty in looking after an electrical plant, and in keeping it up to its standard of efficiency by a system of regular running, cleanliness and general care. Of course, the treatment of dynamos in general applies to motors also. A most important point to be noticed is the temperature to which a dynamo attains after a few hours' run; good modern machines rarely increase in temperature more than 40° to 45° F. above the surrounding temperature of the room in which they are running, after a run of many hours on full load. The parts that are seriously affected by a temperature rise are, of course, the armature and field coils, and any temperature under 130° F. is quite harmless to the insulation of these.

Care should be taken that the dynamo is quite rigid on its foundation, and no vibration whatever should be permitted to take place when the dynamo is running. This point should always be kept in mind by the attendant, who should make it his place to tighten up all loose bolts and bearings as soon as any tendency to looseness is apparent. In setting the brushes on the commutator, the points should always be placed diametrically opposite each other, resting very lightly on the commutator. They will probably need moving forward occasionally to maintain this position, and if it is noticed that the points become ragged or rough and uneven, they should be trimmed with a file or scissors.

It is most important that continuous current machines should be free from sparking at full load. There should be a system of continuous lubrication, and all bearings should run cool. The most satisfactory lubricant to be used for the commutator is vaseline, which should be used sparingly, and wiped carefully off with a non-fibrous rag, in order to leave the least possible amount of lubricant to insure satisfactory results. If the brushes are made of alloy sheets, lubricating the commutator is not often necessary, as they give excellent results without. It sometimes happens that from inattention or structural faults the surface of the commutator becomes grooved and uneven; the armature should be taken out and turned up lightly in a lathe. With moderate attention the commutator should soon assume a fine, dark polish.

When grit or dust gets into the bearings, they should be cleaned by means of thin oil poured into them, which will wash out the dirt. The importance of a perfectly true "run" cannot be overestimated, and a crooked belt which slides from one side of the pulley to the other is sure to give trouble sooner or later. The joint in a belt should be as smooth and as near the size and shape of the rest of the belt as possible, as the damage done to a dynamo with a belt which "knocks" as it passes over the pulley is incalculable.

In order to run in a satisfactory condition the dynamo should make as little noise as possible. One of the first signs of looseness of bolts or vibration is a loud noise, which means that the dynamo is wearing in some part and needs tightening down, or else it is attributable to loose bearings, or armature or pulley out of balance.

It is frequently the habit of an inexperienced attendant to replace a blown fuse with one of greater capacity, thus inducing overload to the dynamo. Automatic cut-outs are used largely recently, which prevent this occurrence. A dynamo may refuse to start if the contacts be loose or bad, or if a circuit be broken and the residual magnetism be diminished. When a motor fails to start or stops, the cause may be a break in the circuit, bad contact or loss of magnetism or overload.

When handling a dynamo when working the attendant should always see that his hands are dry, and if anything goes wrong he should preserve his equanimity, and keep cool, as presence of mind can often avert catastrophe.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

A Word or Two More About Fuel Economics.

OFFICE OF J. F. W. JOST, CHEMICAL ENGINEER.
PHILADELPHIA, PA., May 18, 1905.

To the Editors AMERICAN GAS LIGHT JOURNAL: I note in the Report of the Committee on Fuel Economics of the Ohio Gas Light Association, printed in your issue for May 15th (p. 769), the somewhat surprising statement that, "When insufficient air is admitted a blue flame is seen in the furnace; this is the CO flame and denotes incomplete combustion. The bed should be heavy enough to prevent blow-holes being formed and not sufficiently deep to produce CO gas."

All fuels solid, liquid or otherwise, burn only by the gas they give off. How can the evidence that this gas is being consumed indicate incomplete combustion? For the violet flame, as is well known, is the combining of CO with oxygen to form the ultimate carbon dioxide. Therefore, how can the proof of oxygen present indicate incomplete combustion?

Are we to understand that the coal is to be burned to carbon dioxide in the bed itself, a practice so diametrically opposed to the best methods of modern firing which are predicated upon the presence of this CO flame in the furnace?

Admitting such as a possibility, should we give the entire heat value of the coal up to the bed and confine its effective results entirely to radiation from the hot gases?

The first product of the combination of carbon and oxygen is invariably carbon dioxide. This gas begins to dissociate, however, at about 700° C., and at 1,000° or thereabouts this dissociation is practically complete, the entire amount of carbon dioxide being reduced to carbon monoxide. In a bed temperature above 700° it is, therefore, impossible to prevent the formation of CO.

Of the 970 calories set free when carbon burns to carbon dioxide, only 290, or about 30 per cent., can be credited to the reaction of carbon burning to CO, the remaining 680, or 70 per cent, being given off in the combination, of which the blue flame is an indication. If, therefore, the product of the bed is only CO, we draw this 70 per cent. of heating capacity out of the carbon from it (the bed) to use in a more effective place, and if the violet flame is not present in the furnace one of two things must be taking place: Either the CO, with its 70 per cent. of effective heat, is going up the chimney, or it is giving up its heat to a cool fuel bed.

The whole system of generator firing, the most economical yet devised, is based on this principle. In this system the fuel bed is made to act as a generator for CO, and then this gas is burned where its effective energy will do the most good, where this may be depending upon the purpose for which the fire is used.

In this blue flame, therefore, with which the committee would do away, lies 70 per cent. of the energy of by far the largest and most effective component of the coal.

After statements such as these, is it any wonder that other countries look askance at our prodigality with our fuel supply, nor can we hope for reform until a more rational understanding of the principles of combustion is spread among the users of power.

Very truly yours, J. F. W. JOST.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

AT the annual meeting of the shareholders in the Meriden (Conn.) Gas Light Company the officers elected were: Directors, Walter Hubbard, Chas. A. Learned, Samuel Dodd, C. F. Linsley, George M. Curtis, E. J. Doolittle and F. C. Sherman; President, Walter Hubbard; Secretary, Samuel Dodd; Superintendent, C. A. Learned.

MR. H. C. WEST is now in charge as Manager of the Knoxville (Ia.) Gas Company, vice Mr. Chas. A. Moody, resigned. The executive management of the Company is as appended: Directors, Charles Perry, J. B. Elliott, W. A. Moody, F. V. Reaver, George T. Underhill and R. O. Ayres; President, Chas. Perry; Treasurer, J. B. Elliott; Secretary, W. C. Kinkead.

THE residents of West Burlington, Ia., have voted in favor of awarding the franchise for the supply of gas in that borough to the Burlington Gas Company for a term of 25 years. Manager E. D. Clary declares that West Burlington will be thoroughly piped by August 15th.

THE bench work, in connection with the betterments on the generating plant of the Augusta (Ga.) Company, will be carried out by the Parker-Russell Mining and Manufacturing Company.

A CORRESPONDENT in Portland, Ore., writing under date of the 25th inst., says: "Messrs. F. W. Waters, of Salem, Ore., and his associates have been granted a franchise by the City Council of Eugene, Ore., to there construct, operate and maintain a gas plant. The franchise is for 30 years and provides that construction of the plant shall begin within 90 days and that it shall be completed within 12 months from July 25, 1905. The city reserves the right at all times during the life of the franchise to fix, alter and regulate charges for gas for any and all purposes within the city limits, whenever it may deem it necessary for the good of the consumers. Mr. Waters says the plant will be in operation by December 20th."

A CORRESPONDENT in Harrisburg, Pa., writing under date of May 25, says that the Hanover (Pa.) Gas Company, which has been operated for some time by Philadelphia capitalists exclusively, is again in control of

local capitalists. The executive management is: Directors, L. R. Dutton and F. H. Shelton, of Philadelphia; and R. H. Dutton, George D. Gitt and C. E. Ehrehart, of Hanover; President, R. H. Dutton; Vice-President, C. E. Ehrehart; Secretary, L. R. Dutton; Treasurer, George D. Gitt. The system of main extensions heretofore planned will be completed.

MR. T. F. PRESTON, of Detroit, Mich., forwards the following under date of the 26th ult.: "Some time ago the Michigan Supreme Court decided that any city of the fourth class could not grant a franchise for gas plants for a period longer than 10 years. The Ludington Gas Company, through its attorney, Henry M. Wallace, prepared and had introduced into the Legislature a bill which made valid the franchise which Ludington had granted the Gas Company for a period of 30 years. Mr. Wallace states that the bill has passed both houses and has been signed by the Governor. The work of construction on the plant has been proceeding slowly in view of the doubt existing regarding its franchise, but will now rapidly proceed."

IT seems that the authorities of Norwich, Conn., have at last more than listened to the appeals of Mr. Francis S. Thayer, Superintendent of the Gas and Electric Department, of the City of Norwich, for authority to put the city's lighting plants in some sort of fair condition for the demands that were made upon them last winter, that have continued this spring, and are sure to be more than doubly manifested this summer and fall. That the Board of Gas and Electrical Commissioners (Messrs. John M. Thayer, William F. Bogue and John McWilliams) are now up to their responsibilities in part is evidenced in the fact that, through their urgent persistence, at a meeting of the Norwich City Council, held the 25th ult., it was voted to give the Gas and Electrical Commissioners the sum of $60,000 to expend in putting the old plants in shape and to prepare, in some degree, for the taking on of new business. Under Superintendent Thayer's advice the Commissioners will install a new water gas generating apparatus, and a complete after apparatus, including scrubbers, condensers and purifiers. The equipment also provides for an exhausting outfit, tar and ammonia extractors, etc. The plan also shows the placing of two miles of fair size distributing mains. The expenditure on electric service account includes line renewals and extensions, a new unit of 240 k.w., direct connected, and a new stack. The authorities also propose to increase the public lighting of East Norwich by the maintaining therein of 80 incandescent lights of 25-candle power each.

MR. W. J. MAYS, for many years in charge of the station known as the Lower Gas Works, Richmond (Va.) municipal gas works, has resigned that position. His successor is Mr. Howard Griffin.

AT the annual meeting of the Consumers Gas Company, of Reading, Pa., the officers chosen were: Directors, Samuel T. Bodine, Wayne MacVeagh, Richmond L. Jones, L. T. Custer and Walton Clark; President, L. T. Custer; Treasurer, S. T. Bodine; Secretary, J. W. Miller.

THE following gentlemen were chosen to act as officers of the Sorthwestern Gas and Electrical Association, at the annual meeting held in Denison, Tex., last month: President, M. M. Phinney; First Vice-President, J. W. McLendon; Second Vice-President, E. W. Dunaway; Third Vice-President, J. H. Crerar; Executive Committee, J. F. Strickland, F. N. Deane, W. S. Rathel, R. B. Stitcher, Wilbur H. Young, Frank P. Duffey (Secretary); A. E. Judge, Treasurer; Finance Committee, George H. Cushman, C. A. Stock, F. M. Lege.

THIS is from the North Adams (Mass.) *Transcript*, of recent date: "The Stamford (Vt.) Heat and Power Company, for which a charter was granted recently by the Vermont Legislature, has been organized by the election of the following officers: John Tudor, Chas. D. Houghton, C. H. Cutting, H. T. Cady, E. A. Richardson, J. D. Hunter and F. H. Richardson; President, J. D. Hunter; Vice-President, H. T. Cady; Clerk, C. D. Houghton; Treasurer, F. H. Richardson. The North Adams (Mass.) Gas Light Company will furnish the power as far as the State line, where the Stamford Company will distribute it to the customers in that—the home town.

THE Massachusetts Board of Gas and Electric Light Commissioners has issued an order authorizing the Brockton Gas Light Company to issue 1,300 shares of new stock, of which issue one-half is to be applied to paying off different forms of indebtedness, the balance to go to expenses incurred in plant betterment.

MESSRS. D. C. SPINNING, Joseph Light, George J. Roberts and their associates have sold all the rights and belongings of the Urbana (O.) Gas Light and Coke Company to the proprietors of the Urbana Light Company, which latter concern has been doing more or less of an electric lighting trade in Urbana for some years.

ADVICES from Louisville, Ky., dated May 27th, are to the effect that the properties of the Paducah (Ky.) Gas and Electric Company have been sold by Mr. Thomas Coffee to a syndicate headed by Mr. James C. Utterback, a prominent Paducah banker. "Tom" goes back to Peoria, Ills., a richer (but not the less smiling) man.

MR. CHARLES L. BEATTY, Cashier of the Federal Gas Company, Columbus, O., died at his home in that city some days ago, succumbing from the effects of an operation for appendicitis. He was very well esteemed by his employer (the Federal Gas Company) and is mourned by a host of friends.

THE following communications explain themselves, save for the fact that a scanning of the dates might explain why they were not sooner published:

NEW YORK, May 26th, 1905.

To the Editors AMERICAN GAS LIGHT JOURNAL: By vote of the National Commercial Gas Association the following notice was authorized to be sent to the publications in the field of gas. Therefore, as Acting Secretary I respectfully hand you the same for publication.

Very truly yours, L. S. BIGELOW,
Temporary Secy.-Treas., the National
Commercial Gas Association.

May 13th, 1905.

To the Editors AMERICAN GAS LIGHT JOURNAL: The formation of a National Commercial Gas Association was effected at a meeting informally called in New York City on May 12th. The object of the Association is to promote an increased sale of gas. The plan of operation, which will include details, is a matter that will be arranged at a later meeting. The purpose of the Association is directly commercial. It is not devised to cover the field occupied by the other Gas Associations, since no subjects will be considered at the Conventions of the National Commercial Gas Association excepting those which have to do with the business conduct of a gas company, its sales-promoting work and matters pertaining thereto.

Mr. Richmond E. Slade, Treasurer and General Manager of the Hartford City (Conn.) Gas Light Company, was elected temporary Chairman, and Mr. Lucius S. Bigelow, Editor magazine *Light*, New York, temporary Secretary-Treasurer. These gentlemen will hold office until the first regular meeting, which will occur June 23d, 1905. At that time permanent officers will be elected.

The Committee on By-Laws is made up as follows: Messrs. Wm. J. Clark, Consolidated Gas Company, New York City, Chairman; Wm. H. Allen, The Public Service Corporation, of New Jersey; Mr. Geo. G. Ramsdell, Nassau County (L. I.) Gas Company; G. W. Gatehouse, Brooklyn Union Gas Company; Geo. H. Scranton of the Derby (Conn.) Gas Company.

A membership committee of 15 comprises the following:

F. W. Freuauff, Vice-President, Chairman, Denver Gas and Electric Co., Denver, Col.

H. M. Buegler, Supt. Gas and El. Dept, Elmira Water, Light and R.R. Co., Elmira, N. Y.

A. R. Burr, Sales Agent, New Haven Gas Light Co., New Haven, Conn.

H. P. Collins, Genl. Supt., Herkimer County Light and Power Co., Little Falls, N. Y.

Harry C. Crafts, Supt., Northampton Gas Light Co., Northampton, Mass.

O. M. Diall, Supt., Lockport Gas Light Co., Lockport, N. Y.

Byron C. Fowles, Manager, Pine Bluff Light and Water Co., Pine Bluff, Ark.

John Craig Hammond, Adv. Mgr., A. L. and T. Co., Denver, Col.

Geo. H. Harper, Manager, Altoona Gas Co, Altoona, Pa.

C. W. Lee, Adv. Mgr., Public Service Corp. of N. J., Newark, N. J.

Ira A. Miller, Supt., Colorado Springs Light and Power Co., Colorado Springs, Col.

C. H. Nutting, Supt., Chicopee Gas Light Co., Chicopee, Mass.

Ralph Woodward, Genl. Mgr., Pittsfield Coal Gas Co., Pittsfield, Mass.

I. F. Wortendyke, Supt., New Gas Light Co., Zanesville, O.

E. H. Yorke, Eng. and Supt., Portland Gas Light Co,, Portland, Me.

It was arranged that all of those sending applications for membership to the Secretary's office, 265 Broadway, New York, on or before June 23d, should appear as Charter Members. The annual dues are $5. The Association has before it vast possibilities, and an opportunity to greatly benefit the entire gas industry and all of those connected with it. Increased sales of gas will mean an increased demand for engineering services in providing added output and the delivering of it. The gas company franchise will be increased in value by reason of the same condition. It is hoped by the Association that all of those actively interested in promoting the increased sale of gas will become members.

RICHMOND E. SLADE, Chairman.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
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OHIO GAS LIGHT ASSOCIATION.

NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, JUNE 5, 1905.

The Market for Gas Securities.

A queer general market, with seemingly no one wanting to buy for cash, and a multitude of piking shorts, ruled last week, the net result being a generally lower average of prices in what are known to make the list as a whole. It is not easily understandable why quotations should rule on the low side, when it is in the knowledge of everybody that call money is readily obtainable on good collateral at 2½ to 3 per cent., and that every condition in the mercantile world favors brisk trading. Still the facts are as presented. Consolidated stiffened to 187 bid, as against 185 a week ago; but this may be partly accounted for on the ground that the shorts of last April have been trying to take a bit of their profits.

Brooklyn Union is nominally returned at 183 to 192. Trading in it is absolutely nil. Peoples, of Chicago, is steady at 100¾ to 101, and Baltimore Consolidated shows no change. Laclede preferred is reported at 95 to 101. The United Gas Improvement Company's shares are naturally weaker, as the result of the withdrawal of the Company's proposed bid for the extension of its leasehold of the Philadelphia gas works. President Dolan's official letter announcing the withdrawal reads in queer contrast to the squawking of the geese who opposed the proposition.

These extracts from his clear cut letter sent to us are worth republishing: " * * * The manner in which the whole subject has been treated indicates that the community is opposed to any extension of the gas lease upon any terms, this being so, the Company is unwilling to accept the ordinance which has been passed, or to enter into any contract whatever with the city looking to a variation of the terms of the present lease." Meanwhile we might remark that the city of Philadelphia never knew what a good gas service at a low price was until the U. G. I. Company took over the operation of the plant.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JUNE 5.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	187	188
Central Union, Bonds, 5's.	3,000,000	1,000	108½	110
Equitable Bonds, 6's	1,000,000	1,000	..	109
" 1st Con. 5's	2,300,000	1,000	118	120
Mutual	3,500,000	100	300	320
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co..				
Bonds, 5's	11,000,000	1,000	112	113½
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	35	..
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	..	..	..
Northern Union, Bonds, 5's.	1,250,000	1,000	104	106
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	112	114
" 1st Con. 5's	1,500,000	..	106½	108½
Standard	5,000,000	100	125	130
Preferred	5,000,000	100	145	155
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	117
Yonkers	299,650	500	180	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	183	192
" " Bonds (5's)	15,000,000	1,000	113	115
Bay State	50,000,000	50	¼	⅜
" ncome Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	..	65
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	6	7
" " Bonds, 5's	5,250,000	1,000	66	68½
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas and Electric Co	29,500,000	100	107¼	107½
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	97½	99
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¾	89¼
Preferred	3,026,500	100	107½	109
Consumers, Toronto	,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	23	
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	89½	92
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	..	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	..	104½	105½
" Bonds, 5's	10,500,000	..	107	108
Indianapolis	2,000,000	..	70	75
" Bonds, 6's	2,650,000	..	106½	108
Jackson Gas Co	250,000	50	82	..
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	..
Preferred	2,500,000	100	95	101
Bonds	10,000,000	1,000	108½	109
Lafayette Gas Co., Ind	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	107½	108½
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co	1,000,000	100	110	
Newark, N. J., Con. Gas Co.	6,000,000	..	58	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	2,000,000	25	200	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	100¾	101
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	15,800,000	100	58½	58¾
St. Joseph Gas Co.				
" 1st Mtg. 5's	751,000	1,000	94	96
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	102	.
Washington, D. C	2,600,000	20	308¾	309¾
First mortgage 6's	600,000	..	..	.
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del	600,000	50	230	.

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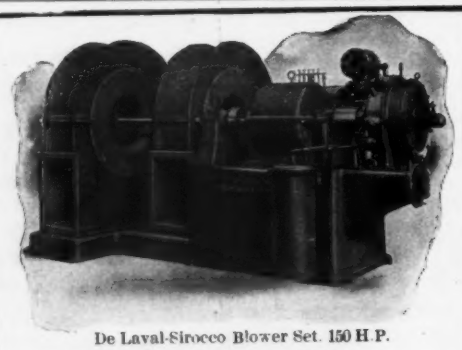

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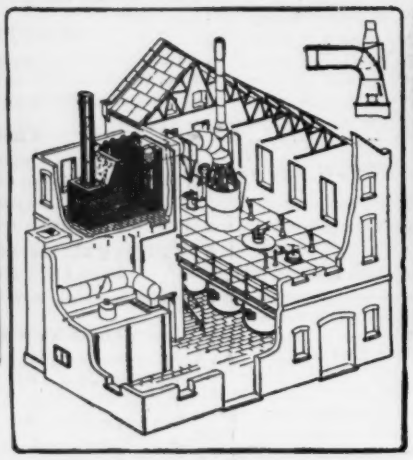

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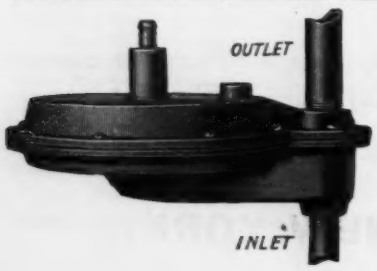

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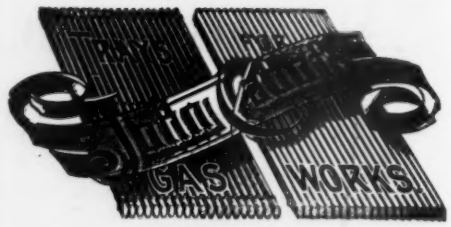

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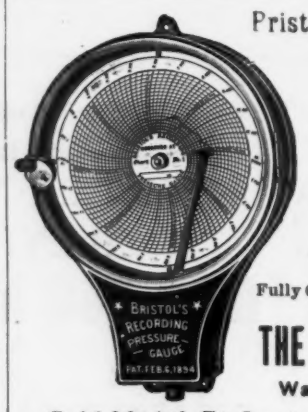

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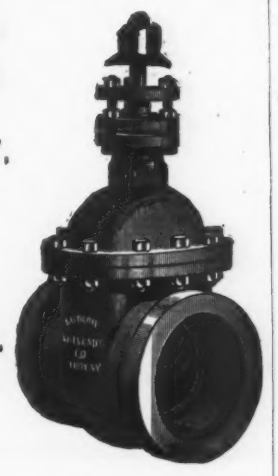

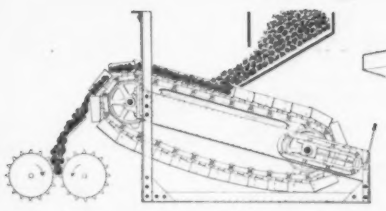

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LINK-BELT ENGINEERING CO.,

PHILADELPHIA.

NEW YORK: 49 Dey Street.

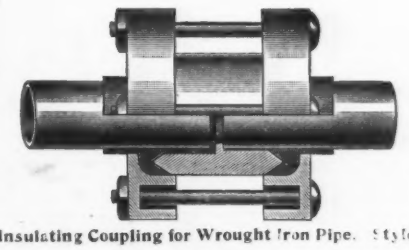
PITTSBURGH: Park Building.

CHICAGO: Link-Belt Machinery Co.

S. R. DRESSER,

BRADFORD, PENNSYLVANIA, U. S. A.,

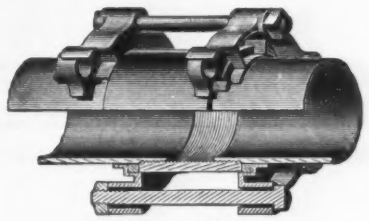
Patentee and Manufacturer of Specialties for Oil and Gas Lines.



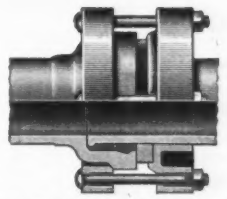
Insulating Coupling for Wrought Iron Pipe. Style 5.

Insulating Coupling for Dresser Bell and Spigot Cast Iron Pipe. Style 6.

Regular Sleeve. Style 2.



Clamp. Style 4.



Clamps for Cast Iron Pipe. Style 4½.

Pipe Couplings, Sleeves, Clamps, Crosses, Tees and Ells.

My Insulating Coupling prevents the destruction of pipe by electrolytic action, in either water or gas lines.

SEND FOR CATALOGUE.

EMPIRE GAS IMPROVEMENT AND CONSTRUCTION CO.

This Company has purchased the patents and goodwill in the business hitherto carried on and owned by *A. M. Sutherland.* It is now ready to contract for the erection and installation of

ENTIRE GAS WORKS,

or any separate portion of the same, such as **Gasholders, Coal Gas Benches, Lowe-Sutherland** double-superheater **Water Gas Sets,** Scrubbers, Condensers, Exhausters, Purifying Boxes, Street Governors, Street Mains and Main Laying.

The high character of the work done by A. M. Sutherland during the past 15 years will be strictly adhered to and all work is warranted.

Mr. Sutherland remains with the Company for two years President and Director, and will give personal attention to contracts.

EMPIRE GAS IMPROVEMENT AND CONSTRUCTION CO., 49 Wall St., New York.

See it Grow!

Lloyd's Rubber Lute

From January 1st, 1905, to date,
Has been contracted for on Purifiers aggregating

15,324,000

Cubic Feet Daily Capacity.

L. C. Co. Catalogue, Sect. 700.

ONLY LICENSED BUILDERS:
Lloyd Construction Co., Detroit, Mich.
Bartlett, Hayward & Co., Baltimore, Md.
Isbell-Porter Co., Newark, N. J.
Stacey Manufacturing Co., Cincinnati, O.

ERNEST F. LLOYD, Patentee,
DETROIT, MICH.

MUELLER GAS METER COUPLINGS.

FOR LEAD PIPE.

C—1048.

FOR IRON PIPE.

C—1049.

If you make your gas meter connections with untested meter couplings, a defect may develop in one after installing the meter and cause you to do the work over.

Mueller Gas Meter Couplings are thoroughly tested at the factory to develop any defect that could render them unserviceable, and you get only the perfect ones. You will have no work to do over on their account.

Mueller Gas Meter Couplings are made in straight and bent patterns, in all sizes from 3 to 200-light, and for all styles of pipe connection. One of the couplings illustrated is for lead pipe and the other for iron pipe.

Each coupling is carefully inspected, is given a 75-pound hydraulic pressure test, bears the Mueller trade mark, and is *unconditionally guaranteed.*

We also make tapping machines, gas cocks and meter connections for gas works' use Catalogues upon application.

EASTERN DIVISION—Located at 254-258 Canal Street (cor. Elm), New York City, carries a full stock of Mueller goods.

THREE GRAND PRIZES were awarded Mueller Water, Gas and Plumbing goods, respectively, at St. Louis.

H. MUELLER MFG. CO.,

DECATUR, ILL., U. S. A. **NEW YORK, N. Y., U. S. A.**

ROOTS' GAS EXHAUSTERS.

GOLD MEDAL AT ST. LOUIS, 1904.

Installation showing our latest improved machines, with flexible rope coupling, for large units.

SEND FOR CATALOGUE.

HOME OFFICE:
Connersville, Ind.

NEW YORK OFFICE:
120-122 Liberty St.

CHICAGO OFFICE:
1547 Marquette Building.

ARTHUR E. BOARDMAN, C.E.,

For several years associated with the late
CAPTAIN WILLIAM HENRY WHITE,
WILL CONTINUE THE BUSINESS OF

CONSULTING ENGINEER

For Gas, Water and Electric Light Companies, at
No. 41 Wall Street, Room 1707, New York.
TELEPHONE, 5534 BROAD.

FRANK D. MOSES,

Telephone, 204-A TRENTON, N. J., Telephone, 204-A

Constructing Engineer and Contractor.

Estimates Furnished on any kind of Work in Connection with Gas or Water Plants.
SPECIAL ATTENTION GIVEN TO THE REMODELLING AND EXTENDING OF THE PROPERTIES OF WORKS NOT UP-TO-DATE.
CORRESPONDENCE SOLICITED.

GEORGE ORMROD, Mangr. & Treas., Emaus, Pa.
JOHN DONALDSON, Prest., Betz Bldg., Phila., Pa.

EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA.

MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

GAS TAPPING MACHINES

—FOR—

Drilling and Tapping Pipe under Pressure

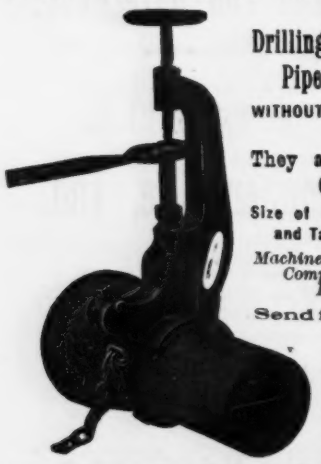
WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.



Geo. Light,
DAYTON, O.

"THE MINER"

Globe Street and Boulevard Lamps.

Cheapest and Best

THOUSANDS IN USE WITH INCANDESCENT BURNERS.

Send for Catalogues.

THOMAS T. W. MINER,
821-823 Eagle Av., N.Y

COAL TUBS.

Self-Dumping and Self-Righting coal tubs with **extra large wheels.** Six sizes kept in stock for prompt delivery.

C. W. Hunt Company,
BODINE STREET, WEST NEW BRIGHTON, N. Y.

GEORGE R. ROWLAND,

Formerly with the Continental Iron Works.

Draughtsman and Constructing Engineer.

Drawings, Specifications and Estimates furnished for the construction of new works or alteration of old works. Special attention given to Patent Office drawings.

Office, No. 245 Broadway, N. Y. City.

GASHOLDER TANKS AND GAS WORKS MASONRY COMPLETE.

Plans prepared and Estimates furnished at short notice.

J. P. WHITTIER,
238 Java Street, Brooklyn, N. Y.

J. F. W. JOST,

CHEMICAL ENGINEER
—IN—
GAS MANUFACTURE,

P. O. BOX 2043, PHILADELPHIA, PA.

WARREN FOUNDRY AND MACHINE CO.,

Established 1856. Works at Phillipsburgh, N. J.

New York Office, 160 Broadway.

CAST IRON WATER AND GAS PIPE,

FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF

Flange Pipe for Sugar House and Mine Work. Branches, Bends, Retorts, etc., etc.

CHARLES MILLAR & SON CO., Selling Agents, Utica, N. Y.

Flanged Pipe and Fittings, Hydrants, Gates, Pig Lead, Jute, etc.

UTICA PIPE FOUNDRY CO.

Manufacturers of Lead Pipe, Solder, etc., and Jobbers of Plumbers' and Tinners' Goods.

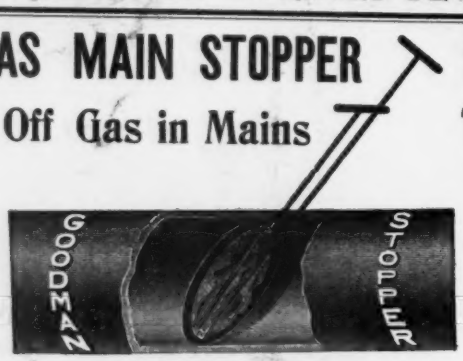
CAST IRON PIPE and SPECIALS FOR WATER AND GAS.

Wholesale Eastern Agents AKRON VITRIFIED SEWER PIPE.

SAFETY GAS MAIN STOPPER COMPANY,

For Shutting Off Gas in Mains

Any size gas main can be shut off in 30 seconds. : : :



Temporarily during alterations and repairs. : : : :

STOPPERS SENT ON TRIAL.

Address: SAFETY GAS MAIN STOPPER CO., 1668 Park Ave., New York City.

This is No. 2.

Height, 36 inches.
Diameter, 13 "
Shipping weight, 80 lbs.
Net weight, 50 lbs.
The products of combustion are entirely separate from the water. Entire water surfaces are tinned.

Price, $35.00.

HOT WATER

FOR BATHROOM AND KITCHEN

is most easily, quickly and economically supplied by a

Humphrey Crescent Instantaneous Water Heater.

Prices range from $20 to $45.
Every Heater GUARANTEED.

Set a heater for every gas consumer. You will please them and increase sale of gas at the same time.

Send to-day for catalogue and discounts to

HUMPHREY CO.,
Kalamazoo, Mich.,

The only manufacturers in the World of a COMPLETE LINE OF INSTANTANEOUS WATER HEATERS.

GAS ANALYST'S MANUAL,

By JAQUES ABADY, M. Inst. Mech. E.

(Incorporating F. W. Hartley's "Gas Analyst's Manual" and "Gas Measurement.")

Ninety-three Illustrations and Nine Folding Plates. Bound in Handsome Half Leather. Price, $6.50.

For Sale by **A. M. CALLENDER & Co., 42 Pine St., New York City.**

AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

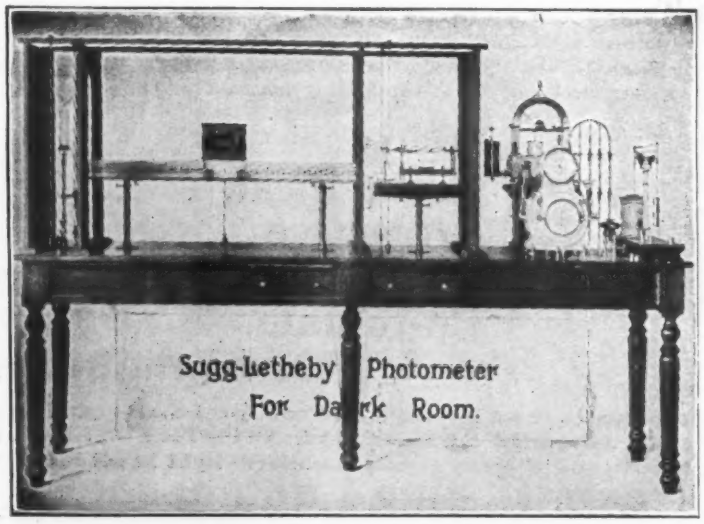
JUNE, 1905.

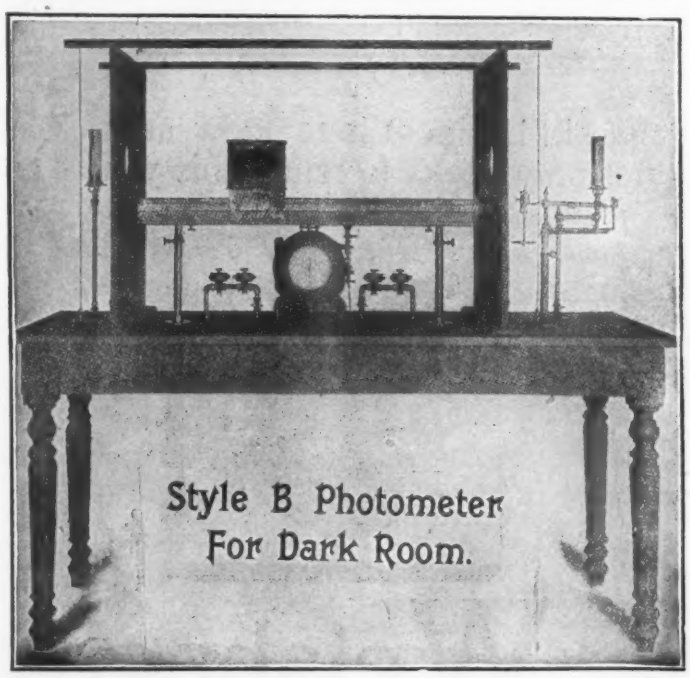
Day of Week.	Table No. 1. FOLLOWING THE MOON. Date.	Light.	Extinguish.
Thu.	1	7.50 PM	3.30 AM
Fri.	2	7.50 NM	3.30
Sat.	3	7.50	3.30
Sun.	4	7.50	3.30
Mon.	5	7.50	3.30
Tue.	6	7.50	3.30
Wed.	7	10.00	3.30
Thu.	8	10.40	3.30
Fri.	9	11.20	3.30
Sat.	10	11 50 FQ	3.30
Sun	11	12.30 AM	3.30
Mon.	12	1.00	3.30
Tue.	13	1.40	3.30
Wed.	14	2.20	3.30
Thu.	15	No L.	No L.
Fri.	16	No L. FM	No L.
Sat.	17	No L.	No L.
Sun.	18	8.00 PM	9.50 PM
Mon.	19	8.00	10.30
Tue.	20	8.00	11.10
Wed.	21	8.00	11.50
Thu.	22	8.00	12.20 AM
Fri.	23	8.00	12.50
Sat.	24	8.00 LQ	1.20
Sun.	25	8.00	1.50
Mon.	26	8.00	2.20
Tue.	27	8.00	2.50
Wed.	28	8.00	3.20
Thu.	29	8.00	3.30
Fri.	30	8.00	3.30

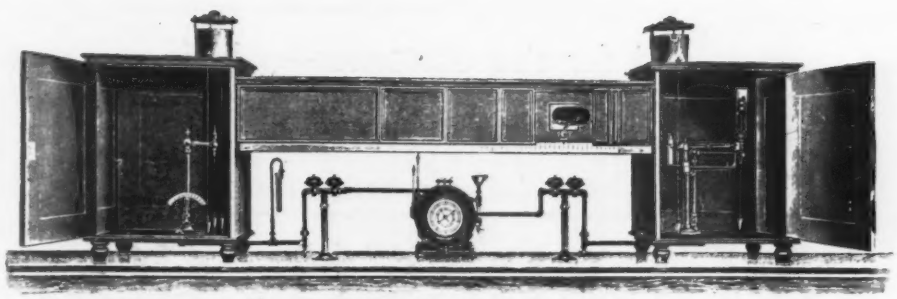
TOTAL HOURS DURING 1905.

By Table No. 1.

	Hrs.Min.
January	240.50
February	192.20
March	207.00
April	175.10
May	161.00
June	139.50
July	149.00
August	161.50
September	173.00
October	205.00
November	211.00
December	229.00
Total, yr.	2245.00







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

JUNE, 1905.

Day of Week.	Table No. 2. NEW YORK CITY. All Night Lighting. Date.	Light.	Extinguish.
		P. M.	A.M.
Thu.	1	7.15	3.15
Fri.	2	7.15	3.15
Sat.	3	7.15	3.15
Sun.	4	7.25	3.15
Mon.	5	7.25	3.15
Tue.	6	7.25	3.15
Wed.	7	7.25	3.15
Thu.	8	7.25	3.15
Fri.	9	7.25	3.15
Sat.	10	7.25	3.15
Sun.	11	7.25	3.15
Mon.	12	7.25	3.15
Tue.	13	7.25	3.15
Wed.	14	7.25	3.15
Thu.	15	7.25	3.15
Fri.	16	7.25	3.15
Sat.	17	7.25	3.15
Sun.	18	7.30	3.15
Mon.	19	7.30	3.15
Tue.	20	7.30	3.15
Wed.	21	7.30	3.15
Thu.	22	7.30	3.15
Fri.	23	7.30	3.15
Sat.	24	7.30	3.15
Sun.	25	7.30	3.15
Mon.	26	7.30	3.15
Tue.	27	7.30	3.15
Wed.	28	7.30	3.15
Thu.	29	7.30	3.15
Fri.	30	7.30	3.15

TOTAL HOURS DURING 1905.

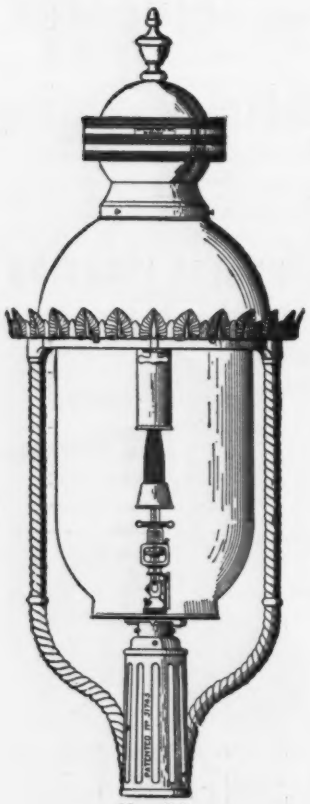
By Table No. 2.

	Hrs.Min.
January	423.20
February	355.25
March	355.35
April	298.50
May	264.50
June	234.25
July	243.45
August	280.25
September	321.15
October	374.30
November	401.40
December	433.45
Total, yr.	3987.45

NEW YORK, 67 Liberty Street. PHILADELPHIA, Broad and Arch Streets. CHICAGO, Foot of Orleans Street.
BOSTON, 814 Beacon Building. ST. LOUIS, 712 Roe Building. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....



No. 36.

Controls and Operates the

Welsbach System of Street Lighting,

Which includes its specially DESIGNED AND PATENTED BURNER for STREET and PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

AN underlying principle in business is to show an increase each year---to grow. The astute dealer not only seeks to retain this year's customers, but to attract new trade next year.

The formula is simple---

THIS SHIELD IS THE WELSBACH TRADE MARK.

IT IS A GUARANTEE AND A PROTECTION.

Sell The Welsbach Brands.

The imitation stuff is bad for the customer---which is bad for you.

The genuine Welsbachs---Burners or Mantles---make satisfied customers---keep customers---MAKE NEW ONES.

And your profit isn't merely dollars and cents.

WELSBACH CO.,

Broad and Arch Sts., PHILADELPHIA.

THE UNITED GAS IMPROVEMENT COMPANY

For the Year Ending December 31st, 1904, has been Awarded Contracts for 45 Sets of

Standard Double-Superheater Lowe Water Gas Apparatus.

PARTIAL LIST OF PLACES:

Harrisburg, Pa.
Pelham, N. Y.
Reading, Pa.
Augusta, Me.
Bangor, Pa.
Woonsocket, R. I. (2d contract).
Brooklyn, N. Y. (4th contract).
Cincinnati, O. (2d contract).
Scranton, Pa. (3d contract).
New York City (14th contract).
New Haven, Conn. (2d contract).
Watertown, N. Y.
Tampa, Fla. (3d contract).
Westchester, N. Y. (3d contract).
Bridgeport, Conn. (2d contract.)
St. Paul, Minn. (2d contract).
Springfield, Mass. (2d contract).
Lynn, Mass. (5th contract).
Rochester, N. Y.
Battle Creek, Mich.
Mechanicsburg, Pa.
Excelsior Springs, Mo.
Bristol, Conn.
Jersey Shore, Pa.
Vicksburg, Miss.

TOTAL SETS, 1904, ... 45
TOTAL DAILY CAPACITY, 1904, ... 56,325,000 cubic feet.
TOTAL SETS TO DATE, ... 553
TOTAL DAILY CAPACITY, ... 419,180,000 cubic feet.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

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CLAY GAS RETORTS, FIRE CLAY TILES, FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

Brooklyn Fire Brick Works,

OFFICE AND WORKS:
88 VAN DYKE ST., BROOKLYN, N. Y.
MANUFACTURERS OF

CLAY GAS RETORTS & SETTINGS, GENERATOR LININGS. SPECIALTIES.

NATIONAL PYROGRANIT COMPANY,

MANUFACTURERS OF

Fire Brick, Tiles, Special Shapes, etc.

NEW YORK OFFICE:
17 Battery Place, New York.

WORKS:
South River, N. J.

DAVID LEAVITT HOUGH,

Consulting Engineer

AND

CONTRACTOR,

PARK ROW BUILDING, N. Y.

Established 1846.

Adam Weber Sons.

Manhattan Fire Brick and Enameled Clay Retort Works.

Works at Weber, on the Raritan River, Middlesex County, N. J.

GENERAL OFFICES: Park Row Bldg., N. Y. City.

ERECTION OF

Modern Coal Gas Plants,

With either Horizontal or Inclined Retorts, Half-Depth and Full-Depth Recuperative Furnaces, Adam Weber Patents.

MODERN BENCH IRONWORK.

Linings for Water Gas Apparatus, High Grade Fire Brick of All Descriptions, Ground Fire Clay, Ground Fire Brick in Bulk or Barrels.

ISAAC C. BAXTER, President.
Works.
LOCKPORT STATION, PA.

ESTABLISHED 1864.

JAMES GARDNER, JR., CO.,

Successor to WILLIAM GARDNER & SON.

PETER YOUNG, Secretary and Treas.
Address all communications to JAMES GARDNER, JR., CO., Room 202 Lewis Bldg., PITTSBURGH, PA.

Fire Clay Goods for Gas Works.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.
OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,

BENCH SETTINGS,

Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick

Price List, f.o.b. BLOOMINGTON, INDIANA.
In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD, BLOOMINGTON, IND.

For orders East of Buffalo, N. Y., or Pittsburg, Pa., freight will be paid to these points.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LIMITED,

Consulting Engineers.

Builders of UP-TO-DATE Machinery and Appliances for Coal and Water Gas Plants. :: :: :: :: ::

PLANS,
SPECIFICATIONS
AND ESTIMATES
PREPARED.

AMERICAN OFFICE:
269 Front St., East, Toronto, Canada.

THEO. J. SMITH, Prest. J. A. TAYLOR, Sec.
A. LAMBLA, Vice-Prest. and Supt.

BALTIMORE RETORT & FIRE BRICK CO.

MANUFACTORY AT
LOCUST POINT, BALTIMORE, MD.

Clay Retorts, Blocks & Tiles

FIRE BRICK, FIRE CLAY, AND FIRE CEMENT.

Our Improved Half and Full Depth Benches have been Adopted by Many Gas Companies.

WALDO BROS., 102 MILK ST., BOSTON, MASS.

Sole Agents for New England States.

JOHN DELL,
President and General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* **Rear Clinkering.** **The Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One** *to* **Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

City Office:
411 Olive Street,
Continental Bank,
ST. LOUIS, MO.

Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada.

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These are the only machines that will draw or charge simultaneously 3 or 4 retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

Hot Coke Conveyor, Quencher and Steam Exhauster, operating in Toronto, Canada, working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

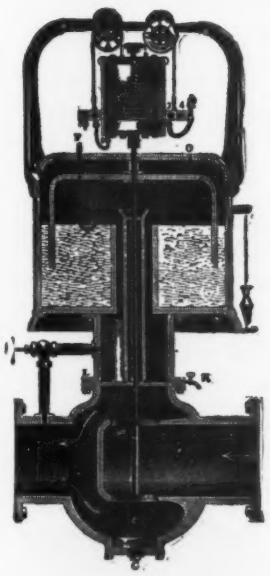
Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins, a Specialty.

G. A. BRONDER,

Contracting Engineer and Builder,

229 BROADWAY, NEW YORK.

CONNELLY IRON SPONGE AND GOVERNOR CO.,



Design, Construction and Extension of

COAL OR WATER GAS PLANTS,

Automatic, Balance, High Pressure and Service Governors,

Roots Improved Gas Exhausters,

Iron Sponge, Purifying Material for Gas Purification Jones Jet Photometers Pressure Registers, etc.,

INSTALLATION OF SMOKELESS TAR BURNING SYSTEM,

Reinforced Concrete Construction for all Purposes,

Wide Experience in High Pressure Installation and Extension,

GAS SPECIALTIES.

395 Broadway, NEW YORK.

295 West 22d Street, CHICAGO, ILLS.

ARTHUR R. CRUSE, President. FRANK FLAVELL, Secretary. AARON E. KEMPER, Treasurer.

Cruse=Kemper Company,

PHILADELPHIA OFFICES: Stephen Girard Building. - - WORKS: Ambler, Pa.

Manufacturers of

Triple, Double and Single=Lift Gasholders,

With or Without Metal Tanks,

Oil and Water Tanks, Purifier Covers, General Plate Metal Work, and Steel Water Towers.

Plans, Specifications and Estimates Promptly Furnished on Request.

Chollar's System of Gas Purification.

THE PURIFIED GAS REVIVES THE FOULED OXIDE.

Practical Photometry,

By William Joseph Dibdin.

Price, - - - - $3.00.

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A. M. CALLENDER & CO.,

42 Pine St., New York City.

JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

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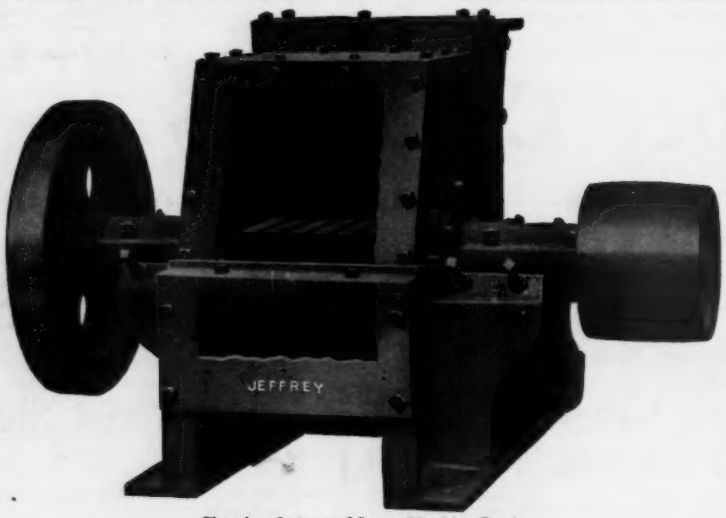

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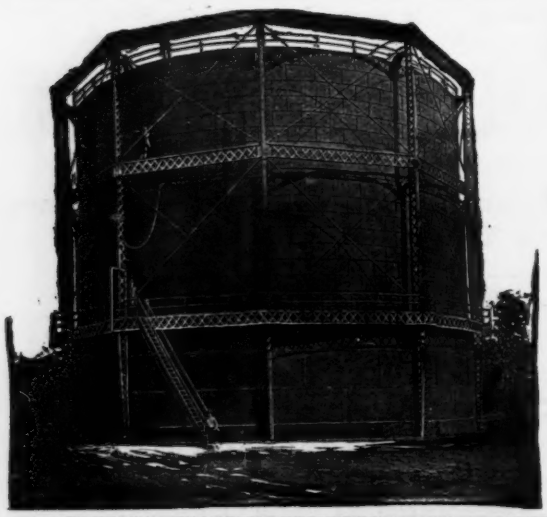

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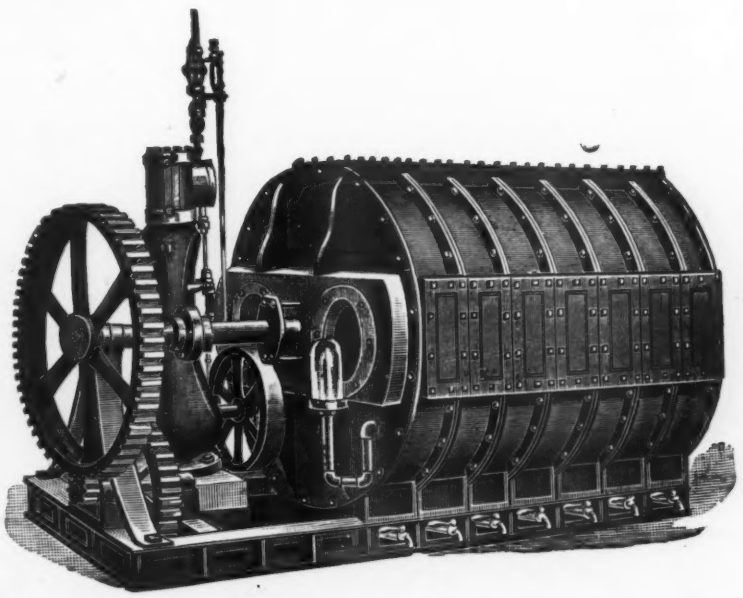

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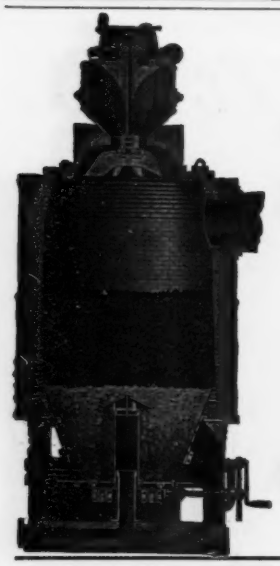

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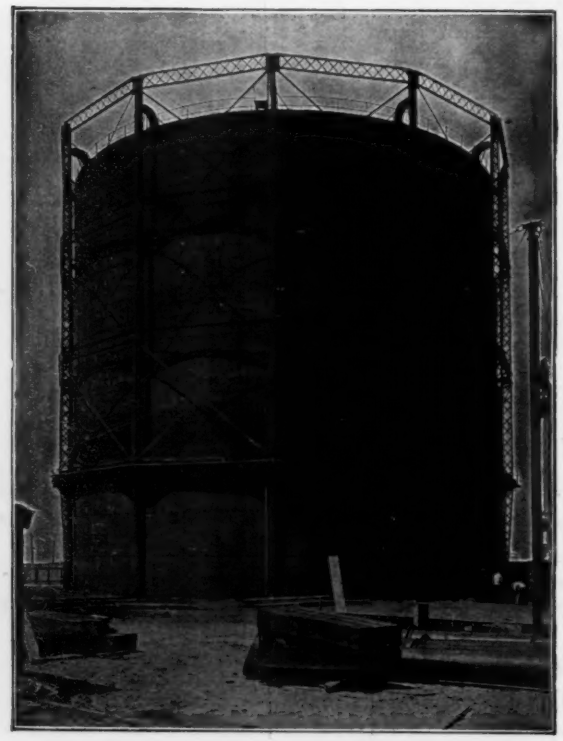

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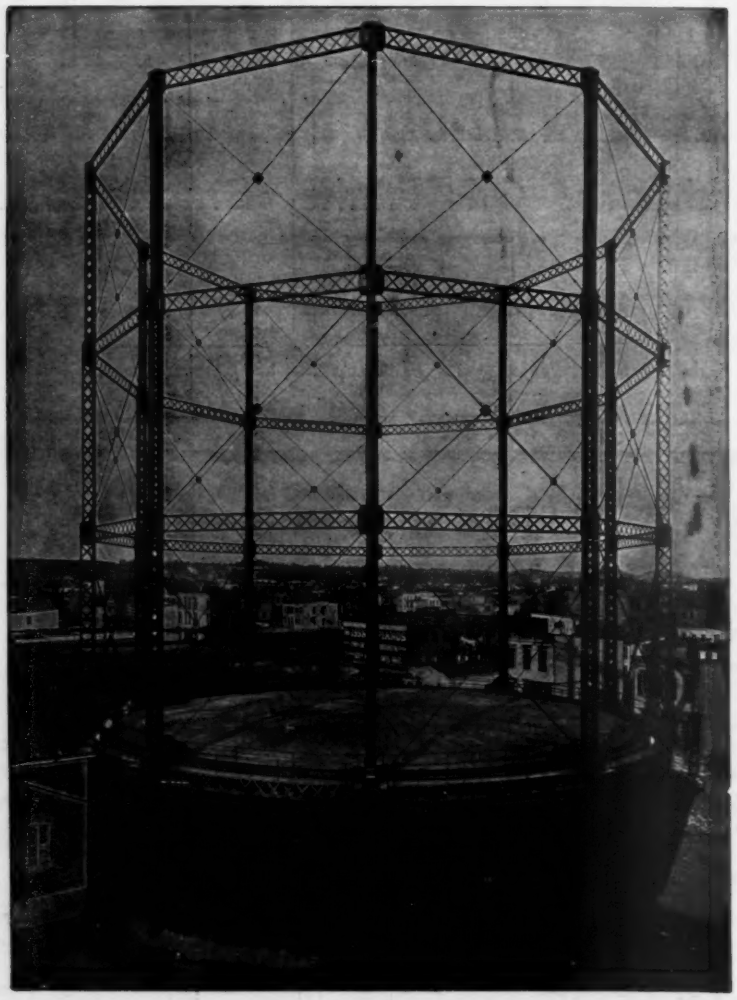

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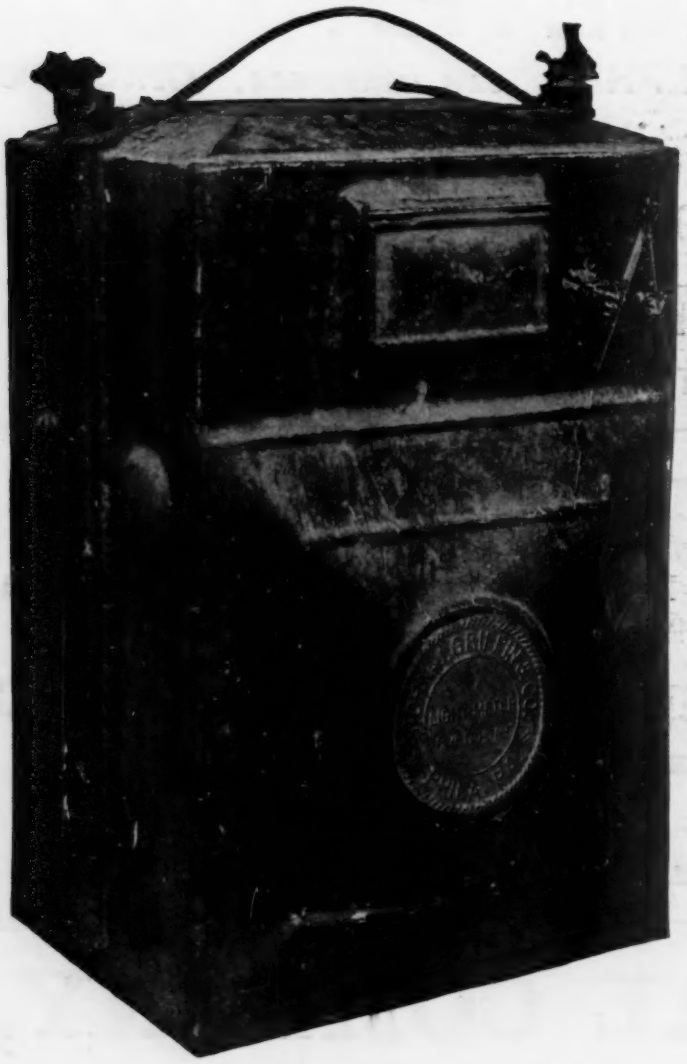

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